

COAL AGE

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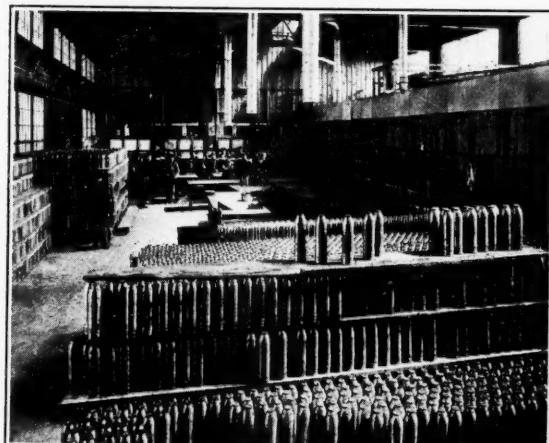
The Interpretation

Written expressly for "Coal Age"

By RUFUS T. STROHM

FORGET that coal is a stony mass
That grimes the breaker and chokes
the screens,
And try to think, as you watch it pass,
Of all that its shiny blackness means;
For when you see that it's tons of steel
For shell and rifle, for wheel and rail,
For plate and armor, for rib and keel,
You will not falter, you dare not fail!

EACH time your shovel completes its
round,
The coal that over it slides and runs
Will make steel bullets enough to pound
The daylights out of a hundred Huns;
And four such shovelfuls represent
The polished form of a three-inch shell—
The pointed sort of an argument
That Yankee fighters can handle well.



"Four shovelfuls of coal represent the polished form
of a three-inch shell"



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*The boys who go "over the top" in France offer their lives.
Can we at home offer less than our full-time labor?*

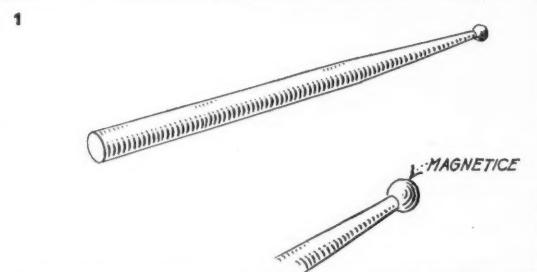
AFULL day's yield of a mine will feed
The flaming maws of a transport ship
That cuts the sea at a greyhound's
speed

With an army corps at a single trip;
But it takes the coal that a mine can turn
In the space of six or seven days
To build that vessel from stem to stern
And send her slithering down the ways.

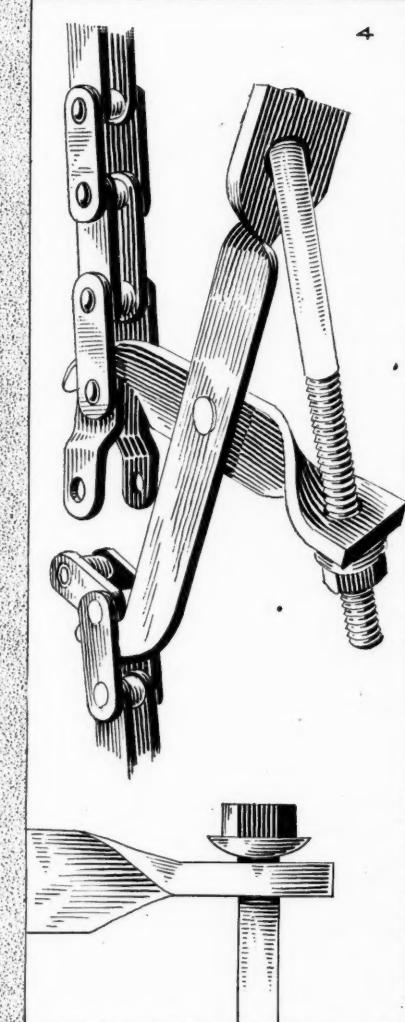
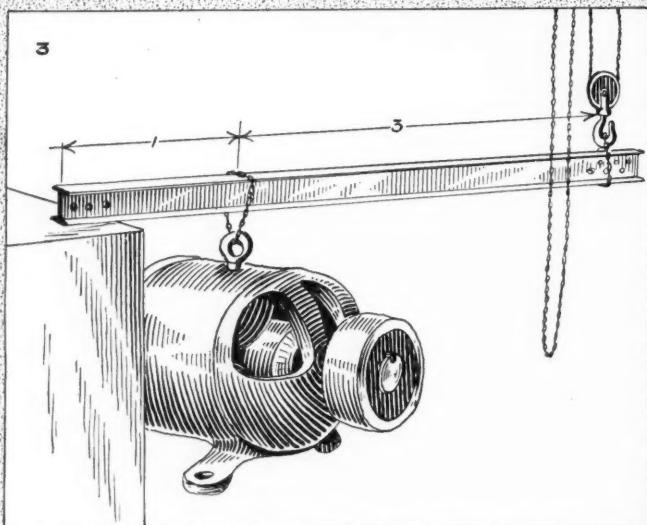
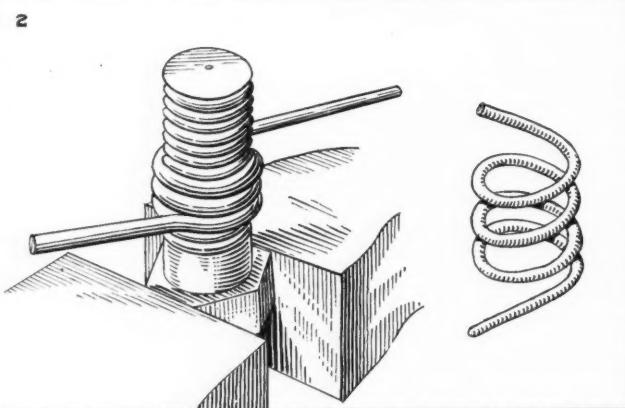
WITH every stroke of your flying pick,
With every blow on the ringing drill,
You're doing your own small part to
lick

The 'tarnal tar out of Kaiser Bill;
For coal is the thing that will stem the tide
And write the end of the bloody tale,
So, while we battle with Prussian pride,
You must not falter, you dare not fail!

IDEAS AND SUGGESTIONS



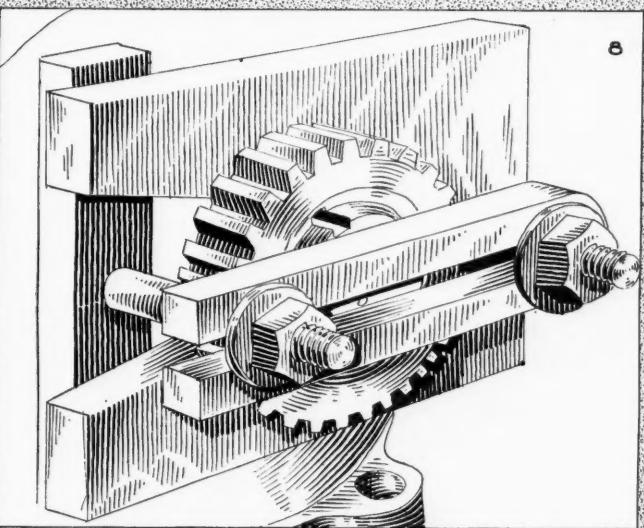
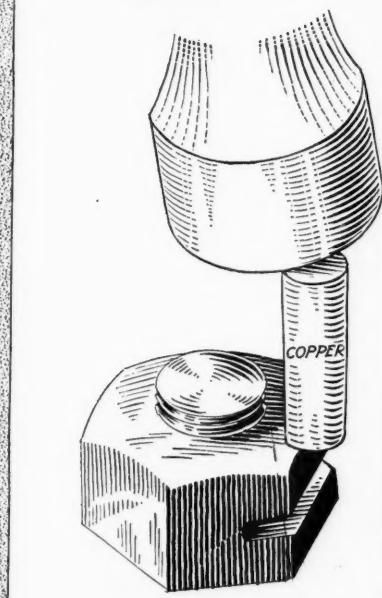
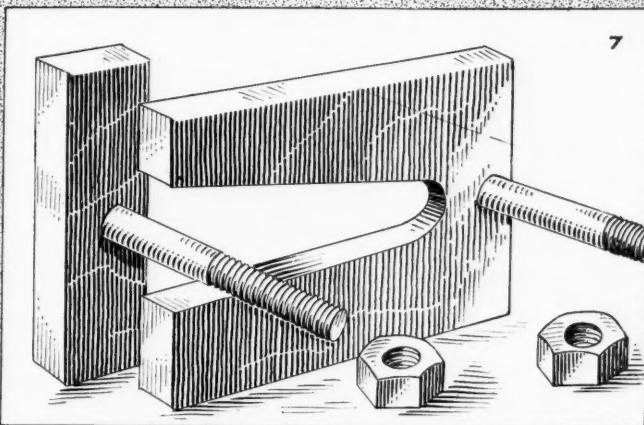
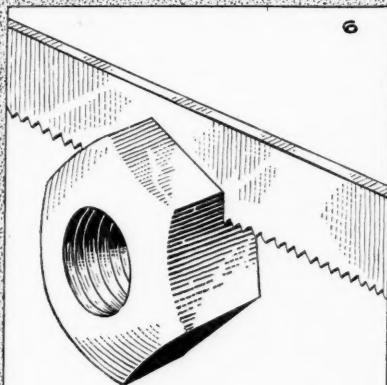
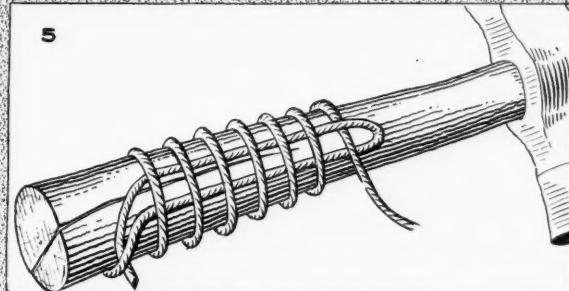
- 1 A GREAT AID IN REMOVING IRON CHIPS FROM THE EYE
- 2 A NEAT WIRE COIL MADE UPON A SIMPLE SCREW
- 3 A HANDY CHAIN TAKE-UP
- 4 CONVERTS A 1 TON HOIST TO 3 TONS CAPACITY



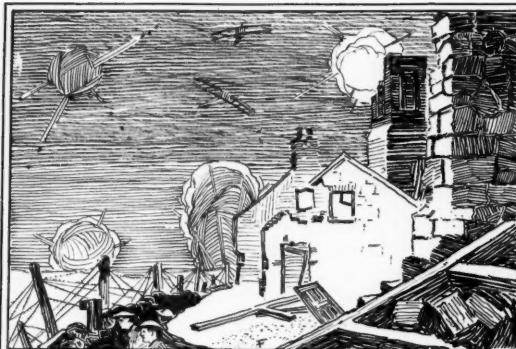
Little Schemes That Have Proved Their

KINKS FOR USE AROUND THE MINE

- 5 EFFICIENT LASHING FOR A SPLIT HANDLE
- 6 A READY MEANS OF LOCKING A NUT
- 7 A HOME-MADE ADJUSTABLE GEAR PULLER
- 8 HOW THE GEAR PULLER IS EMPLOYED



Utility and Value in Cases of Emergency



Coal, Explosives, War—I

BY H. J. BROUGHTON
Wilmington, Del.

SYNOPSIS—*This article is the first of a series of three on this subject. It sets forth the relation that coal bears to business in general and the conduct of war in particular. Coal is of such prime importance that all means possible should be employed to increase its production. The careful and intelligent use of explosives may be made a potent factor to this end.*

EVERYWHERE has been heard the call for efficiency, conservation and coöperation, owing to the stress of war which has laid new requirements upon the country and upon industrial organizations. No more beneficial thing could be proposed than efficient conservation by coöperation, to avoid waste and promote production of coal.

Without coal we cannot wage war, cannot progress in manufacture nor can we live with any degree of comfort. Coal is one of the most commonplace articles with which we come in daily contact, yet at the same time one of the most important. Its possession by a community or a nation means comfort and progress, and simultaneously a strong strategical position from a military standpoint.

The equivalent of ten tons of coal a second is running to waste over Niagara while "Speed Up Coal Production" is being agitated. Niagara is only one instance of waste energy. The streams of this country in which millions of horsepower are running to waste every day could be made a perpetual source of wealth and prosperity.

When we hear of a cathedral or other work of art being blown to atoms, or an almost priceless bronze statue being melted up to make bullets, we are likely to think it a shame. It would be much less a shame to harness the power that is now going to waste in streams that in thousands of cases are merely beautiful sights to be gazed upon, while we go hungry for the things their power would supply. Many trains could be driven by the energy of the restless mountain streams without seriously affecting their attractiveness or in any way detracting from their beauty.

Another enormous saving of coal could be accomplished by using the million of feet of lumber, the millions of cords of wood that are now being wasted, not only in the form of cut and standing timber, but also in the form of stumps. This has developed into such a momentous question that it will be only a matter of time before the Fuel Administration will take a hand in its solution. The Ohio Fuel Administration has already announced that shipments of both hard and soft coal to communities where there are no essential war industries may be stopped entirely.

On our farm lands in every direction is an immense supply of wood waste, in wood lots and stumps without number. Particularly in the case of the latter have we a fuel supply that is cheap, ready at hand and abundant.

Many hours could be saved by the consumer in unloading coal from the cars as soon as they arrive at their destination, could he be brought to the realization that every hour saved may be the means of saving a soldier's life in France. Millions of tons of coal could be produced, but it could not be moved at this time for want of cars; and the time wasted in unloading the cars makes a surprising total when the number used for this purpose is considered.

When electric generating stations are located at the mines, doing away with the transportation of much power coal, we will have accomplished something worth while. All railroads could be electrified, factories operated from central distributing stations and isolated plants abolished.

Our present-day boilers and furnaces are inefficient in getting the biggest percentage of heat out of coal. Newer apparatus that can burn poorer grades of fuel are needed badly. This would tend to conserve a large amount of the supply. Many owners of plants using coal are sleeping a dreamy sleep, dreaming that their plants are efficient, that they are getting the greatest possible percentage of energy from their coal. When they awake and find how much real money they could save by using a little of it now, to increase the efficiency of their coal-consuming apparatus, they will wish they had set their alarm clock for an earlier awakening.

By not properly insulating steam pipes last winter

much steam went to waste that otherwise could have been used to advantage just at the time when coal was needed most vitally. Next winter should see every exposed pipe covered with the proper amount of insulation. The saving thus afforded would pay for many a ton of coal, but the initial expense of installation seems to bother many a man otherwise cautious.

So when we see a lump of coal and consider its immense value as a force in civilization, and realize how practically all industry at present depends upon this fuel, we can look a little farther and perceive that at the present time our production of coal depends largely upon explosives; but of equal importance is how these are employed. When properly used, they result in a greater quantity of coal being produced with less effort. This means a conservation in man-power.

Every effort is apparently being put forth by the coal operators, the miners' organizations and the individual miner, but closer attention to details will work wonders. And if the householder is to be kept warm, while our ships, railroads and factories run at war speed and ordinary business proceeds without lessening its forward trend, more attention to blasting details must become the rule at the mines.

The welfare of our country depends upon those who have learned, or will learn, to do in the right way the things that are to be done. Just now the demand for production has overcome time-honored rules and ways of doing things in every form of industry, coal mining included. More direct and more efficient methods must be adopted, and the stereotyped way improved upon. The great question that every miner must ask himself is, "Am I going to embrace this opportunity to be of service to my country in its hour of need, or am I going to dodge the issue and go on with my work as usual?"

Every miner's reputation is at stake. The greatest prosperity the world has ever known will be the lot of this country after the war, and the men who have hung back and have not tried to do their utmost are the ones that will suffer for what they have failed to do. The man with the reputation for doing things is the man who will gain in the end. He who pays a little more and unusual attention to performing his work better right now than he has ever done before will be the man remembered by his superiors when peace comes.

The miner is going to be just as instrumental in winning this war as the soldier and sailor, with the exception that the miner will not be called upon to risk his life; for there is little need of risking his life in his daily occupation if he will but study improved methods of doing his work. It is his patriotic duty to do so. It is either face this fact now, or duck and dodge and be called upon to suffer later.

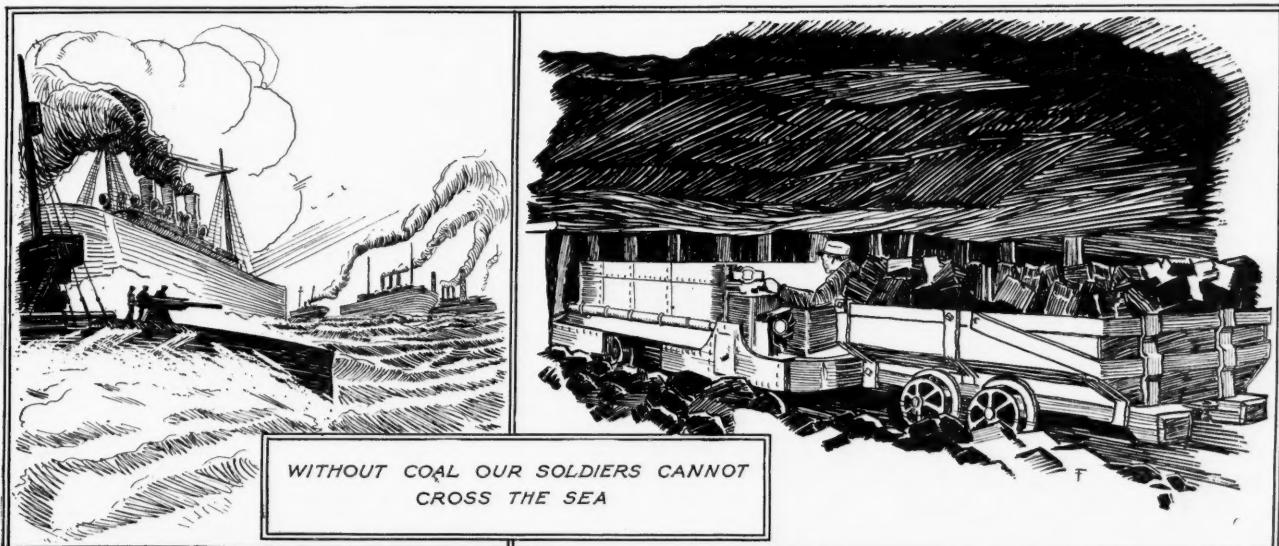
In a recent statement Franklin K. Lane, Secretary of the Interior, said: "Our three-quarters of a million coal miners produced 644,000,000 tons of coal in 1917, an increase of 54,000,000 tons over the previous year, notwithstanding transportation conditions in certain regions were worse than ever before in the industry. The increased output of war-making materials shows very clearly how faithful, how energetic, how patriotic has been the army of miners upon whose efforts depends our production of these vital supplies. . . . If the demands increase this year, our efforts will also increase. What we must achieve we shall."

MANY MEN TAKEN BY THE DRAFT

The call to the colors has taken many men from the mines. Alien coal diggers have flocked in great numbers to the land of their birth; the draft has drawn away countless others, while many more have been attracted by wage inducements offered by the industrial concerns engaged in the manufacture of war supplies.

If additional labor cannot be secured, more efficient methods of production must be practiced. One of the greatest of these is the proper use of the means we have at hand, by men who are patriotic enough to take a sufficient amount of pride in the increased production to warrant their search for, and use of, more efficient methods of employing explosives in blasting coal. Close attention to the details offered by the makers of explosives in the various handbooks of instruction published by them will do much toward relieving this situation.

In many places the men are laying off three days a week, and only working enough to insure their ordinary wage. That there is a shortage of labor is no excuse for those now engaged to lay off and become slackers. The Government should take a hand in this matter and draft the services of the men and compel them to work full time, as the soldier and sailor have to do. Without



coal our soldiers cannot cross the sea. More coal must be produced, hence the miner should try to do more than his ordinary share.

Another way in which the miner can be of great assistance is by paying particular attention to the amount of "gob" that he allows to come up with the coal. It takes just as much power to transport this useless mess as it does to carry clean fuel. For every pound of slate delivered to the consumer, a pound of coal will later have to be delivered, that he may get maximum production. Every bit of gob going into the firebox means just so much added to the destruction of the grates. Industry can speed up, railroads can haul more and use less fuel, warships can make faster headway, every manufacturing plant can multiply production if clean coal is the rule and not the exception. This is up to the miners, who must see to it that the coal is at all times loaded clean.

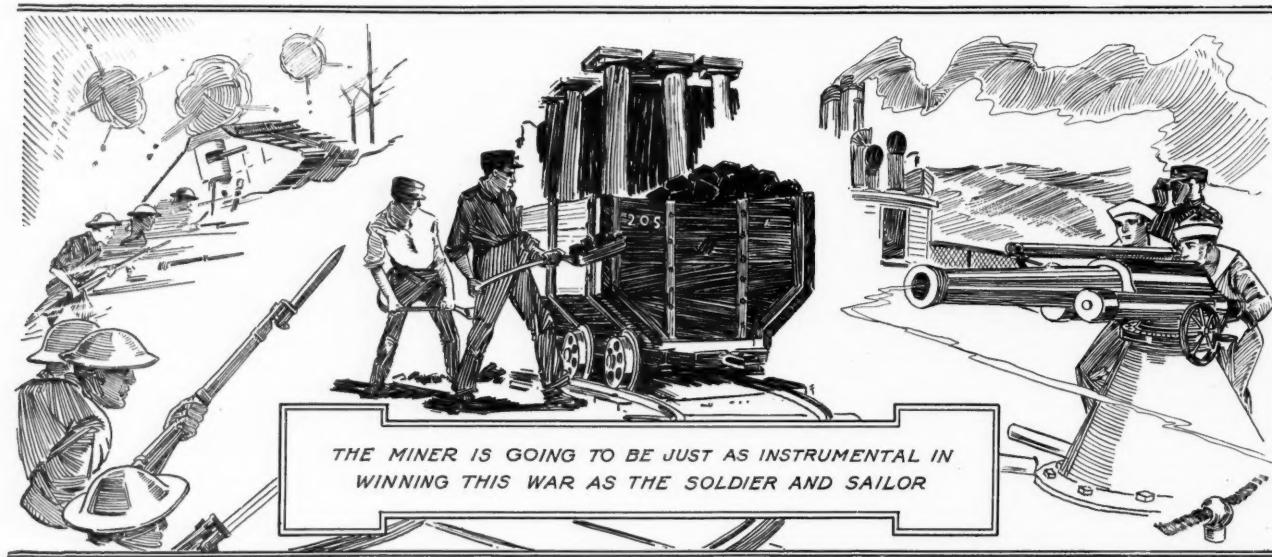
Unfortunately, in the mining of coal a great deal of inflammable gas is encountered, this amount varying in different localities. Some of the mines are filled with gas pockets so that their upper workings are full of an inflammable mixture of gas and air. Some of these

awful price; even mines known to contain gas and dust have been operated for years without an explosion. But is this because of good management or is it just luck?

It must be remembered that not all coal mines are gaseous and dusty, and vast quantities of blasting powder are used today in producing lump coal in mines which are practically free from gas and which are so wet that dust does not hang in the air.

Gas and dust explosions in England, France and Belgium became so frequent that chemists were set to work to devise some explosive that would give a shorter and cooler flame than that produced by black powder. These researches eventually resulted in the production of what are known as "safety explosives," or "permitted explosives," in the United States. In Europe the national authorities designate what explosives shall be used in the coal mines, whereas in the United States the national government only specifies which explosives are recommended for use in dangerous coal mines.

Permissible explosives, when properly used in accordance with the instructions furnished by the manufacturers and the United States Bureau of Mines, give a flame of such short length and duration that



operations, in addition to being gaseous, are very dry, and the dust from the coal fills the air. The combination of these two—the gas and the dust—makes a mixture which is not only easy to explode, but in which detonation when once started becomes self-propagating throughout the mine workings. Such an explosion nearly always results fatally.

The great development of the mines, caused by the demand for fuel, drove the operators to seek coal that lay far below the surface. This necessitated shafts into gaseous territory, with headings driven miles from the openings, requiring thousands of cubic feet of air to supply the miners. The air gives them life and strength, but at the same time absorbs the moisture, dries out the mines and makes the dust more inflammable. This dust is easily placed in suspension by a passing trip, or a heavy or windy shot, which may short-circuit the air. Then comes a "blowout" shot with its terrible results that make one shudder and wonder that some means have not been taken to lessen the toll paid for the mining of coal. True, thousands of tons of coal have been mined without this

ignition of gas or dust mixtures does not take place. Not only this, but the fact that these explosives are made up in cylindrical form and do not have to be either poured or broken, makes their handling much safer than that of black powder—contrary to the popular notion.

Permissible explosives, being a first cousin, as it were, to dynamite, it would naturally seem that they would be more dangerous to handle than black blasting powder; but such is not the case, as they are very difficult to ignite—that is, they do not burn readily—and for their explosion require an intermediate agent known as a "detonator," or "blasting cap." They are also much less sensitive to detonation than is dynamite and require a powerful detonator to completely explode them.

A permissible explosive is defined as follows: "An explosive is considered permissible for use in coal mines when it is similar in all respects to the sample that has passed the tests required by the Bureau of Mines and when it is in accordance with the conditions prescribed."

It is generally understood that a permissible explosive should be used in all those coal mines containing dust and gas; however, there are difficulties to be overcome in this connection. The greatest difficulty is the prejudice of both the operator and the miner. The next is the improbability of being able to induce the miner to use the explosive in such a manner as to get its greatest efficiency. It can be shown that in using permissible explosives the operator is buying the cheapest kind of mine insurance. The miner also, in using permissible explosives, is gaining the cheapest kind of life insurance.

At a great many collieries the miners make a habit of using the "combination shot"—that is, using black powder and dynamite in the same borehole. This pernicious practice has always been the great objection against the use of the better grade of permisibles, owing to the fact that a good permissible will not satisfactorily detonate when black powder is used as a detonating agent. Consequently, until a definite stand is taken against the use of the combination shot by the operators, and also by the mine inspectors, little progress can be made toward increasing the use of permisibles.

When mine operators come to a realization of the necessity for protecting their men, they will squelch the combination shot and absolutely enforce the use of permisibles, or black powder with electric firing. The use of electric blasting caps with permisibles is recommended for the reason that all miners are in a safe place before the shot is fired and the risk is not run of hang-fire from a piece of fuse that does not burn properly.

The proper placement of boreholes and the use of the right explosive assure a maximum production and avoid the necessity of either redrilling or drilling extra holes in making the original shots, in this way saving much labor in boring. The first cost of permisibles to the miner is a trifle higher than that of blasting powder, but if it were possible for him to fully appreciate and realize the safety feature, the difference in the air, saving in time in allowing him to return to his work and the lessening of falls of slate from a broken roof, he would gladly pay the difference.

The blasting of coal with black powder in the presence of gas and dust mixtures is dangerous. Black powder produces a long, hot flame from the charge in the bore, which instantly ignites any gas or dust present.

The flame temperature of all explosives is above the ignition point of inflammable gas and dust mixtures, but the flame of a permissible explosive is of such short duration that under the conditions of blasting down coal it does not ignite the gas and dust present. There is only one plausible reason for not using permisibles, and that lies in the preparation of the coal. It cannot be denied that coal shot with permisibles is racked more than when shot with blasting powder, but in many instances this is caused by misuse of the explosive, or by not selecting the one best suited for the coal. Sometimes a fast powder will give a better coal than a slow one, but proper undercutting with properly placed holes should give a good-sized lump without an excessive quantity of slack.

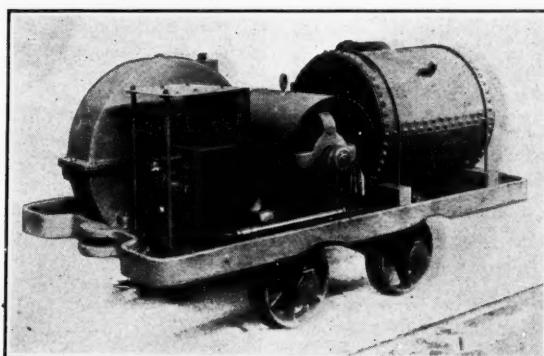
(To be continued)

Portable Motor-Driven Compressor for Mine Use

It has been said that coal will win the war. Therefore, anything that will help to increase the production of this fuel is of interest, not only to the mine operator but to the whole nation as well.

A useful machine in this connection is the small portable compressor manufactured by the Ingersoll-Rand Co. for mine service, either as an auxiliary to the main compressed-air system, or for development work in operations without compressed-air service. It can be used for operating drills, coal cutters, air lifts and for other purposes. The complete outfit is mounted on a truck with flanged wheels of a gage to suit the mine track, and can be hauled wherever needed.

This type of compressor is made in capacities up to 415 cu.ft. of air per minute and for pressures up to



PORTABLE COMPRESSOR FOR OPERATING DRILLS, COAL CUTTERS AND AIR LIFTS

100 lb. The motor, which is built by the Westinghouse Electric and Manufacturing Co., is designed to operate on the available current, and is furnished in sizes ranging from 12 to 56 hp., depending on the capacity of the compressor. A large air receiver forms a part of the outfit. Into this the air is pumped and the pressure therein is automatically maintained constant.

Compressor at Coal Mine

There are nearly always opportunities for operators to pick up bargains in second-hand machinery by watching the advertising columns of technical and trade papers. A progressive Illinois coal man recently, in commenting on this subject, pointed out the advantages of having a small compressor at his plant. He had purchased a small second-hand air outfit, set it up at his mine shop, and it is now doing good service.

Many of the numerous small jobs around a coal plant can be facilitated by power machinery. Possibly riveting is to be done on a cage, on the steel framework of the tipple, or other metal work. Holes are to be bored in heavy timber or drilled in metal away from the shop. As part of the shop equipment, the air lines may be extended to various nearby points about the plant to furnish power when needed. The operator in question considers the use of live steam too expensive a means for blowing off boilers—he utilizes compressed air for the purpose. Like many another facility, its application multiplies with the many opportunities afforded for its use.

Conservation of Miners by Employment of Mechanical Equipment

BY R. L. HERRICK, M. E.
New York City

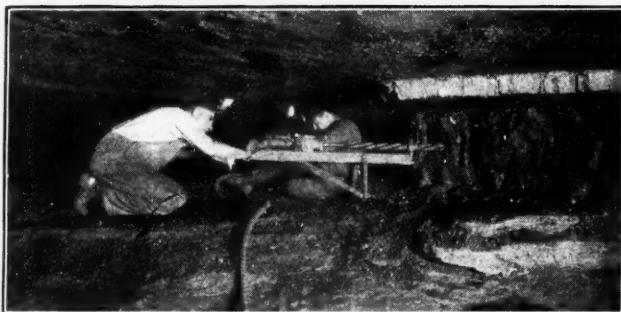
MINE-LABOR shortage is the "bugaboo" of the anthracite district. Recent drafts to the army have aggravated an already bad labor condition. Before the draft many mines were running with mine crews depleted from 15 to 40 per cent. from those of normal pre-war times, and now the production of anthracite threatens to ebb to a new low mark. The mining situation presents a curious discrepancy, however, that may well be noted. It is this: While the loss of many men has adversely affected the production of some of the largest and oldest mines of the district, others with similarly reduced mining crews have actually increased their tonnage investigation into the causes of this discrepancy has led me to the conclusion that the gain or loss of tonnage is largely a question of mechanical equipment. Those mines which have held their tonnage output to about normal—or if anything have increased it—have installed modern machinery equipment which has conserved the man-power of the organization. Instances are common where the installation of certain machines has made what was formerly heavy labor now easy on the men, and at the same time allowed one or two of them to do the work formerly requiring the united efforts of six to eight. It is, of

course, understood that the men thus released from routine work have been immediately transferred to the vitally important work of getting out coal.

In what follows it is proposed to give typical examples of such man-power saving as have come under my immediate observation in the course of a 450-mile automobile trip about the mines in various parts of the anthracite district. For the figures upon which various statements are based, I am indebted to an engineer intimately acquainted with the district through long residence—William Wilhelm, Scranton manager of the Ingersoll-Rand company. To what extent will it pay to replace hand with machine drilling? The anthracite operator is squarely face to face with this issue to-day. And upon his answer to that question largely depends the amount of man-power conservation he will be able to effect. In general terms it may be stated that coal is in say from one-fifth to one-sixth the time that the same holes can be put in by hand. The hardness, dampness and physical properties of the coal vary widely in different parts of the anthracite district, and all of these conditions affect the speed of drilling. Thus in some sections the hand drilling of a 6-ft. hole requires say 10 min., while in

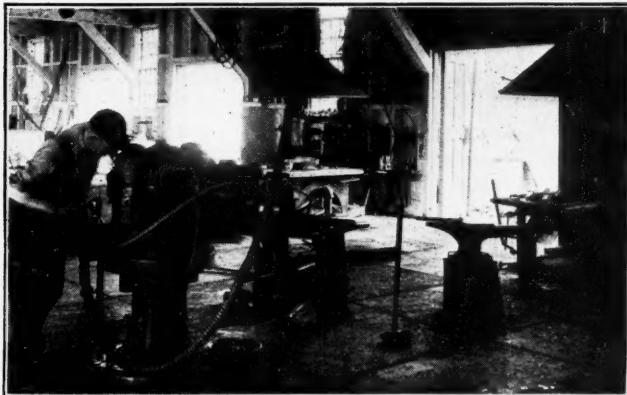


FIGS. 1 AND 2. THE SMALL DRILL IN THIN COAL



FIGS. 3 AND 4. ILLUSTRATING THE USE OF JACKHAMERS IN A THICK COAL BED





FIGS. 5 AND 6. CHANGES IN A BLACKSMITH SHOP FROM USE OF DRILL STEEL SHARPENER

others it cannot be done in less than 30 min. In general, therefore, the same holes will require only say 2 to 6 min. when drilled by machine.

On the face of the situation thus presented there could be no question about the advisability of universally adopting machine drilling. But actually there are a number of other considerations which influence the operator. Perhaps one of the elements most vitally affecting the problem is the fact that in most of the large operations the miner is practically a free agent. He is paid by the ton of coal, or yard of advance in rock, and his hours of work are advised, but not dictated, by the mining companies. In addition to this, the miner owns his own tools, although he may be financed by the operator to enable their purchase.

Under such conditions it is only natural to expect that machine drilling of coal is in vogue only where the mining conditions themselves caused the miner to employ drills in order to make, what are to him, satisfactory wages without a great deal of unnecessary hard work and in a satisfactory number of hours of labor.

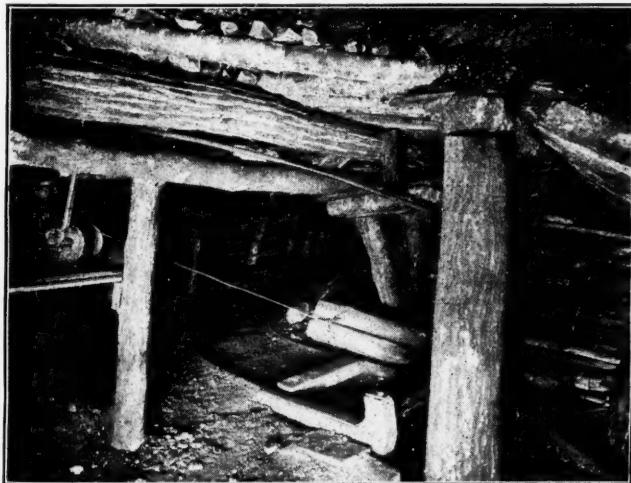
So far mining conditions have made immediately advisable the adoption of machine drilling only in thin beds of comparatively small pitch. War conditions such as high price, etc., have enabled the working of such beds at a profit. Hence, in thin measures we find machine drilling of coal naturally making its first big progress of supplanting hand drilling. This is not meant to imply that in thick beds progress with machine drills has not been large, but only that this progress has been comparatively greater in thin beds. Some of the reasons for this condition are made plain by contrasting Figs. 1 and 2, showing thin-seam mining, with Figs. 3 and 4, which illustrate conditions in much thicker beds of coal. Fig. 1 shows the drilling of a bottom hole in an anthracite bed which is only



FIG. 7. TAKING UP BOTTOM

20 to 24 in. thick. In this case a plank is used on which the Jackhamer is slid along. Fig. 2 shows another view in this same bed, using a JC-40 drill mounting. The bottom of this bed consists of 6 in. of bone and is consequently exceedingly hard to drill.

Such beds as this were practically impossible cer-



FIGS. 8 AND 9. SMALL HOIST HANDLING PIT PROPS AND LOADED CARS

tainly unprofitable, to mine with the old hand-auger drilling method, but have been made profitable with machine-drill methods which produce a good tonnage per day.

Fig. 3 shows the drilling of a horizontal hole in the Dunmore vein, which, as plainly shown, consists of alternating bands of coal, bone and slate, making up a total thickness of about 6 ft. Such a bed is hard to drill by hand, and hence the favor shown to machine drills. Fig. 4 shows taking up the rock bottom with a $\frac{1}{2}$ hexagon steel replacing the twisted bit in the same drill shown in Fig. 3.

An example will suffice to still further clarify the situation: A coal bed 30 in. thick is mined in the Scranton district by rooms 30 ft. wide. The coal face is attacked by say from 11 to 14 holes, drilled about 6 ft. deep, which should blast down 450 cu.ft. of material, netting say 16 tons of coal.

The hand-auger drilling of these holes will require an average of say 30 min. to the hole, thus requiring 6 or 7 hours of labor. The machine drilling of these holes will take only from 55 to 70 min. to complete, although these are by no means the quickest figures on record.

Figs. 1 to 3 all show the use of twisted cruciform steel in connection with the Jackhamers. These machines differ in no way from the standard drill striking a hammer blow, but the use of twisted steel allows the standard drill rotation to produce an auger-like effect in the holes, thus rapidly clearing them of pulverized coal (clearly shown in Figs. 1 and 2 beneath the steel).

The use of this cruciform steel has rapidly grown in favor, especially during the past year in the Scranton district. It was originally furnished by the manufacturer in sizes to accommodate the usual diameter of black powder cartridges. But in response to the demand for hand-drill outfits in other districts, where Monobel powder is in use, another size of twisted steel is being manufactured and will soon be available.

For the mining of thin coal beds the drill mounting shown in Fig. 2 has proved a boon to the miner. In fact its lightness enables quick movement from place to place, while its operating features reduce the miner's drilling job to a sinecure. He has only to push the drill straight ahead, and it practically runs itself.

Aside from being easier than hand-holding upon the

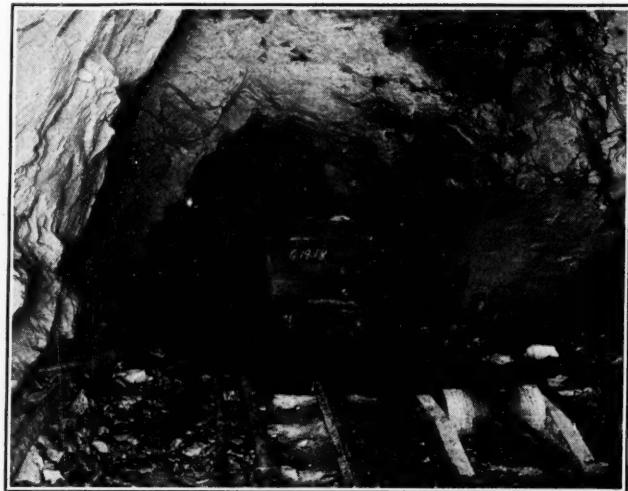


FIG. 10. A SHORT STEEP GRADE

drill operator, the mounting performs the double function of providing a steadyrest in starting and pointing the hole, and that of furnishing a support during the drilling. Without such a support the average miner lets the drill practically hang upon the drill steel after the latter has advanced 6 or 8 in. into the coal. The support afforded by the mounting has been found to practically eliminate drill steel breakage arising from this cause.

While machine drilling of coal is apparently most common in the thin beds, and in those thick ones whose bone and slate layers make hard hand drilling, it has a great future in the thick and easily hand-drilled seams. Wartime conditions seem certain to hasten the coming of that future.

The visitor to the various mines of the anthracite district is somewhat puzzled to account for the facts as he sees them. For instance, in many thick and easily mined beds he finds the Jackhamer busy, as shown in Fig. 7 taking up the rock bottom. For rockwork nearly every mine in the district has such machines by the score. But when it comes time to mine the coal, the miner picks up his hand auger and goes at it. This may not be the rule, but I saw it often enough throughout this district to be impressed by its frequency.

For example, in the case of the mine shown by

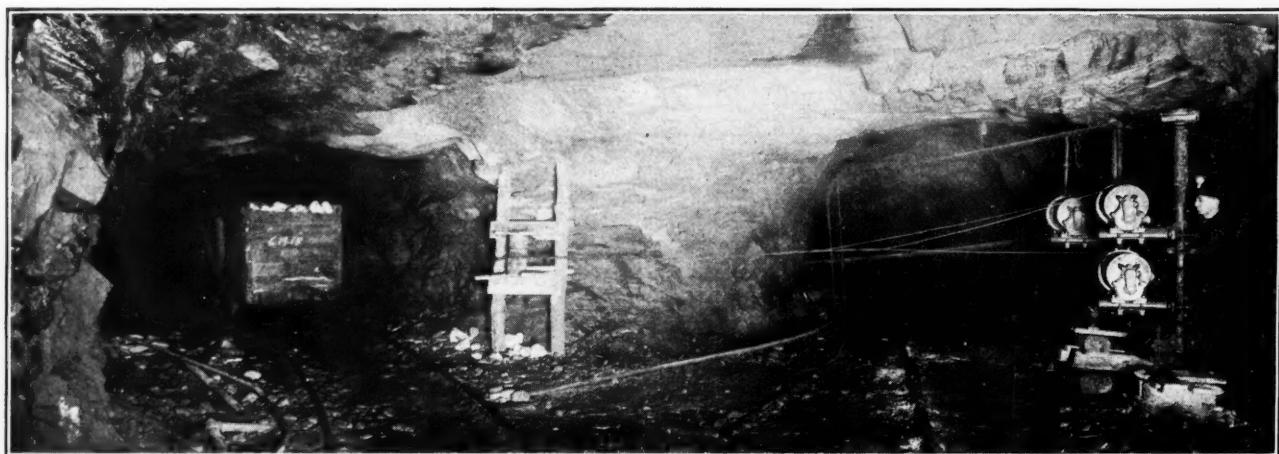


FIG. 11. THREE SMALL HOISTS PULLING CAR UP GRADE SHOWN IN FIG. 10

Fig. 7 the coal bed was 8 ft. thick, had a high pitch, and the coal itself was comparatively soft. The miner could drill his 8-ft. holes in about 10 min. each by hand auger, and could completely drill his room in about two hours. Under the present working conditions he could bring down in a few hours all the coal by hand that his one "buddy" could load in a day.

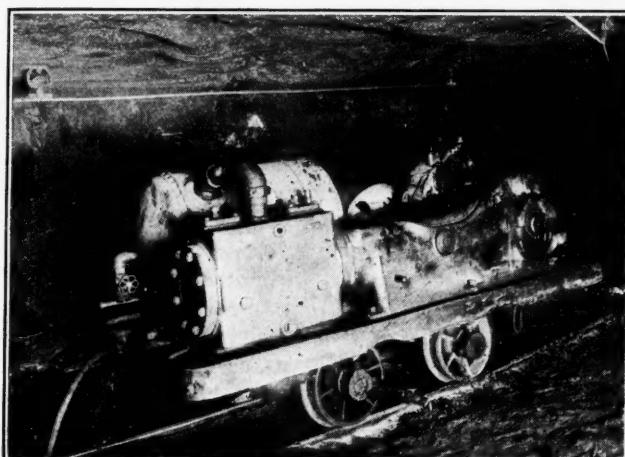


FIG. 12. PORTABLE AIR COMPRESSOR UNIT

Those few hours enabled him to quit about noon well satisfied with his usual day's wages.

This particular miner was not interested in the machine drilling of coal, and for obvious reasons. This illustrates the perplexing problem some mine operators face today. The present situation may, in fact, be paraphrased as this: "One miner, one auger and one buddy." Why should it not be: "One miner, one machine drill and four buddies?"

Is there any reason why the miner should not acquire greater dignity as the employer of four helpers instead of one, and make increased mining profits in proportion? Must the correction of a decreasing coal production be impeded by the old-established custom of having one buddy only? Upon the answer to these questions may hang the fate of nations!

Suffice it to say that it is believed that under changed conditions a machine-drill miner can easily replace four hand-auger men in thick beds and thereby allow the saving of three miners, thus made available for either increasing the coal output or filling the gaps in the ranks of the buddies drafted into the army. Fifty hand-machine drills installed in a mine should result in a man-power conservation equivalent to 150 miners per day.

Many of the coal-mining companies of the anthracite district have greatly increased the number of hand-machine drills employed underground during the past year. As a result, an increased burden of steel sharpening has been thrown upon the blacksmith shop.

The sharpening of hollow drill steel by hand is a comparatively slow and unsatisfactory method. In the average shop a blacksmith and helper will hand-sharpen about 35 to 40 seven-eighth-inch hexagon steels per day, depending upon their condition. And since the blacksmith must rely solely upon his eye for gaging, he usually makes a gage interval of about $\frac{1}{4}$ in. between successive steels of a drill set in order to insure against

sticking. This handwork is so slow that frequently defects develop in the bit due to its cooling before it is properly shaped.

With the increased demands upon the blacksmith shop for steel sharpening, many mining companies started the installation of Leyner machine sharpeners. These have proved one of the most pronounced labor savers introduced into the district. The situation before and after the installation of one of these sharpeners in one of the largest shops of the Scranton region is shown by Figs. 5 and 6.

In this shop there are four forges employing four blacksmiths and four helpers. Fig. 5 shows one side of this shop with the men employed at the hand-sharpening of steel. Fig. 6 shows this same shop after the installation of a machine sharpener. The operator of this machine did all the steel sharpening of the eight men and turned out a large amount of routine blacksmith work in addition. The seven men thus made available were badly needed at other work about the mine and were so utilized.

Aside from this labor-saving feature of the machine sharpener the bits themselves are far superior to the hand-made ones. Owing to the perfection of bits, made inevitable by the machine's gaging, it was possible to reduce the gage interval between steels to $\frac{1}{16}$ in. instead of the $\frac{1}{4}$ in. as formerly. This results in greater drilling speed in the mine.

This machine sharpener is equipped for making the shanks on 1 $\frac{1}{2}$ -in. twisted cruciform steel. Besides its common work of shanking and sharpening steels, it is admirably adapted to blacksmith work of many kinds, such as making boltheads, and even drawheads for coupling mine cars. Some of the mines have fitted up these sharpeners with dies for making mine-car couplings, which work is being done with great rapidity.

In many sections of the anthracite district, particularly where the coal beds are of steep pitch, the movement of mine timbers into the upper workings presents a real problem. In such places the Little Tugger hoist serves a double purpose—that of supply-

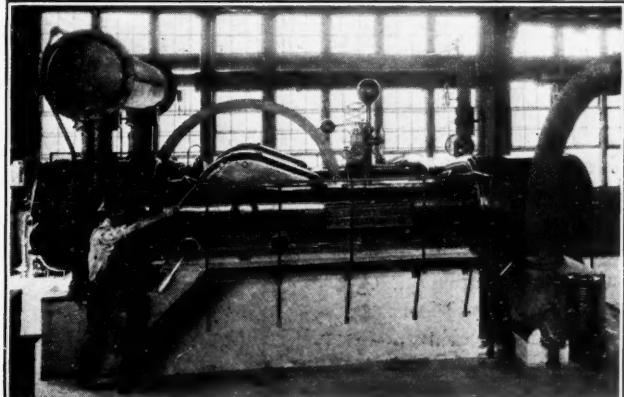


FIG. 13. A MODERN AIR COMPRESSOR ON THE SURFACE

ing the needed tractive power and furnishing air for ventilation.

A typical installation of its kind is shown in Figs. 8 and 9. In one section of the Catherine colliery of the Trevorton Coal Co., the Lykens No. 2 vein pitches 15 $\frac{1}{2}$ deg. and the steady movement of timbers up such a steep slope taxed the endurance of the men formerly

employed on the job. A slope 250 ft. long connected two levels. Up this the timber was moved, and down it was discharged the coal extracted in the development of the upper level.

The development of four rooms and two gangways required six mine-car loads of timbers per day, and for carrying up the timbers by hand six men were formerly employed constantly.

Fig. 8 shows the Little Tugger hoist recently installed in close quarters at the head of the sheet-iron-lined timber chute. Its $\frac{5}{16}$ -in. wire rope is pulled down into the lower level, where one man attaches it to the timbers on the cars. On signal, the hoist then pulls up from three to four timbers 14 ft. long and averaging 8 to 10 in. in diameter. The ropeman rides the timbers to the upper level and returns with the slackened-off rope.

The timber is thus hoisted with only one man in addition to the hoist operator. These two men thus accomplish, in one-half day, the work formerly requiring six men all day. The other four men are accordingly available where badly needed for getting out coal. The hoist, therefore, performs the equivalent of eight men's work per day.

The hoist has a speed of 85 ft. per min. in lifting a maximum weight of 1000 lb. vertically, but in hauling these heavy timbers 250 ft. up the slope, about 5 to 6 min. are required for the round trip by the ropeman.

When not in use for timber hauling, this machine is available for hauling coal in a one-ton buggy from the face of the level along a slight grade, to the rocker dump at the head of the chute. Fig. 9 shows the loaded buggy approaching this discharge point.

Scores of these hoists have already been installed in many mines of the anthracite district. They are used for a wide variety of purposes, such as, for instance, the hoisting of rock in buckets from shallow shafts, the hoisting of tools and men into raises, and even pulling 40-ton capacity empty coal cars up a slight grade to a loading position beneath the discharge chutes of a breaker.

At another large colliery an unusual installation of these machines shows their strength as well as adaptability. In driving a rock tunnel to connect with a shaft, it was desired to use the 108-cu.ft. capacity cars, standard about the mine, to receive the rock mucked from the face. The rock tunnel connection was about 300 ft. long and had only a slight grade except at one point—shown in Fig. 10—where for about 50 ft. the track was given a grade of 10 per cent.

The 108-cu.ft. car loaded with rock weighs about

12,000 lb., and to pull it up the 10 per cent. grade three hoists were installed, as shown in Fig. 11.

The concentration of three separate hoists pulling three ropes attached to one heavy car is, of course, rather unusual and would not often happen except in emergency cases, and then only for temporary work. This installation serves to forcibly illustrate, however, the extreme flexibility of these machines, and the possibility of tiding over, with them, a situation where the delivery of a powerful single hoist under present conditions would seriously delay urgently needed mine development.

I have noticed a large number of installations of these little hoists in the anthracite district. In each case the machine did the work formerly requiring from six to eight men. Assuming, however, that each one effects a man-power conservation of at least four men, twenty such machines effect a conservation of at least eighty men. There are a number of companies throughout the district which have installed this many machines or even more.

In the foregoing, mention has been made only to man-power conservation made possible by increased coal production due to machinery. Another phase of the same problem is the decreased coal consumption of the mines themselves, due to improved equipment for power production. This brings us to the subject of improved machinery for compressing the air utilized in all the machinery mentioned above.

Anthracite operators may, for descriptive purposes, be divided into three classes as regards their method of compressing air. The first and possibly largest class depends upon small portable units installed underground. The second class depends wholly upon large central surface compressor plants, and the third class, in which there are comparatively few, depends upon both surface and underground units. For instance, one large company has several scores of portable compressors underground, but is at the present time installing several surface units.

Referring to the small portable compressor machinery underground, the most popular machine in the district is the Ingersoll-Rand mine-car type, shown in Fig. 12. These cars are moved about from point to point in the mines and are usually placed in some niche or out-of-the-way spot from which the air can be conveniently piped to the drills. When hose is employed for air transmission, the compressors are usually placed within 200 to 300 ft. of the drills; but frequently the air is piped as far as 800 to 1000 feet.

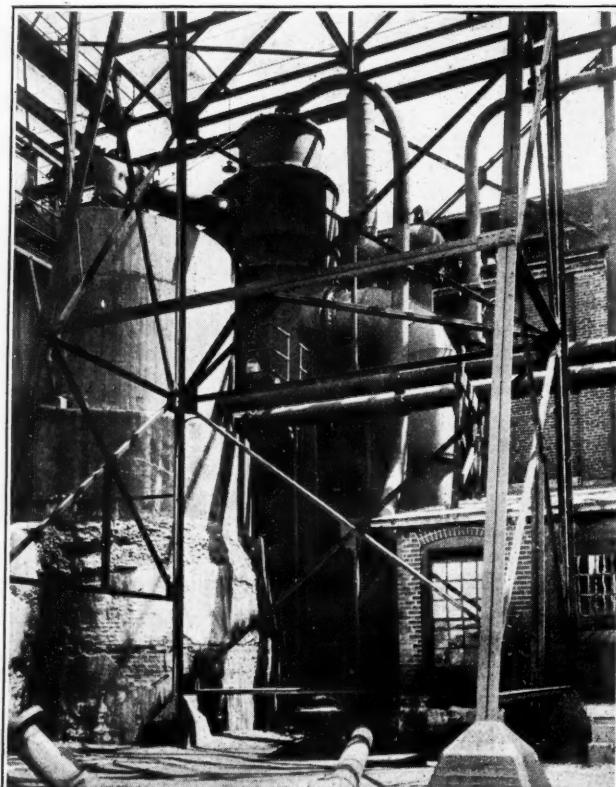


FIG. 14. AN ACID-RESISTING CONDENSER

These portable compressors are made in several sizes capable of furnishing air from two to eight hand-machine drills, their equivalent in Radialaxes and small hoists. The compressor cars carry a water-cooled compressor, its driving motor, air receiver and automatic starting rheostat. To connect with the power system it is only necessary to hang the bare end of the cable over the trolley wire at some convenient out-of-the-way point. Any laborer can start the compressor without danger to either himself or the machine by simply throwing an ordinary knife switch. He can then go away and leave the machine running and, except for daily attention in filling the compressor hopper with cooling water, it needs no further care since lubrication is automatic.

If by reason of stopping all the drills the air pressure rises to a predetermined pressure limit, the air intake is automatically closed, thus cutting off the load on the machine and reducing its power consumption until such a time as the drills are again operated, when the automatic opening of the intake again allows the compressor to carry the load.

The obvious advantages of such an installation are the saving of transmission losses incident to long lines and the saving of power at all times, except when the drills are actually running.

In the case of the mining companies who produce their compressed air in surface plants and pipe it underground, their compressor economy is undoubtedly superior to that attained in the small portable units.

MANY SURFACE PLANTS HAVE BEEN REMODELED

During the past year many of these surface compressor plants have been completely overhauled and reequipped with modern machinery capable of making notable savings in coal.

A new compressor plant typical of a large number of installations in the district is shown in Fig. 13. This illustrates an Ingersoll-Rand, Type XPV, size 18 & 29 and 26 & 16 x 20-in. stroke. It has a rated capacity of 1955 cu.ft. of free air per minute, develops a maximum of 344 i-hp. and has a steam consumption of only 15 lb. of steam per $\frac{1}{2}$ -hp.-hr. running condensing.

This type of compressor has a number of notable features, but they may all be summarized by saying they give practically a Corliss steam economy for less than Corliss first cost. This is due in large measure to their piston valves, which are especially adapted to the use of high steam pressures and superheat.

Many of the old compressors, which newer equipment recently displaced, compressed the air in a single stage and operated noncondensing. A brief example from actual practice will serve to illustrate the coal economy made possible by the installation of these new compressors having two-stage air compression, steam compounding and run condensing.

The old compressor required 129 lb. of steam per 1000 cu.ft. of free air actually delivered at 100 lb. pressure. The new compressor required only 68.3 lb. of steam per 1000 cu.ft. of air when operating noncondensing, and only 50.6 lb. of steam per 1000 cu.ft. when run condensing. The difference in steam consumption between the old compressor run noncondensing and new compressor operated condensing, for equal delivery of air, is 80,800 lb. of steam per 10-hour day. This

saving, expressed in terms of fuel consumed at the rate of 1 lb. of coal per 5 lb. of steam, is 16,160 lb. of coal per day.

To furnish the air required for fifty Jackhamers, two such compressors would probably be required whose saving over former compression methods would be at least 16 tons of coal per day. This is equivalent to the coal productions of two men per day from some thin coal beds.

CAN MINE WATER BE UTILIZED?

The majority of mines in the anthracite district produce rivers of water from their drainage systems which are not utilized in condensing plants because of their acid nature. The condensing problem seems to be peculiarly difficult in the Scranton district, where the mine water is strongly acidulous and boiler water must be purchased from city mains.

Considerable experimenting with various types of condensers has been conducted by one company during the past two years, with the view to finding a way to utilize its mine water. All the condensers tried inevitably ended on the scrap heap after about 90 days' corrosion by the acid water, until finally the Beyer condenser shown in Fig. 14 was installed. The steel craneway shown in this illustration was doubtless built over the condenser in expectation of the necessity for making frequent and rapid repairs. This condenser has, however, now been in service nearly a year, and so far has given no sign of corrosion. This is due to its superior internal design and partly, of course, to its wood lining of heavy thickness.

This condenser handles the exhaust from a 5000-kw. Curtiss turbine and holds a high vacuum with a remarkably small variation of temperature between the hot well and the entering exhaust steam.

The present steam consumption of the Curtis turbine is about 19 lb. per kilowatt-hour, whereas the former consumption when, during condenser breakdowns it was run noncondensing (for which it was not designed), was about 35 lb. per kilowatt-hour. The Beyer condenser is therefore to be credited with making a saving of 40 tons of steam per hour when run at full load, or over 400 tons per 10-hour day.

Translated into terms of coal consumption with 1 lb. of coal producing 4.2 lb. of steam, the coal saving equivalent of 400 tons of steam is about 95 tons of fuel daily, or the equivalent of about 10 men's mine production.

While it is manifestly not conservative to say that every mine should install the equipment described above, enough has been said to show the possibilities latent in its use.

As stated at the beginning of this article, the mine-labor shortage in the anthracite district is its "bugaboo." The situation is bad, but in the light of the foregoing it seems reasonable to suppose that some improvement can be made by companies that have not already installed modern machinery equipment.

When coal is burned carbon dioxide and water are the final products of complete combustion. The extent to which they are dissociated depends upon the temperature in the furnace and determines the limit of completeness of combustion.

Determination of Latitude and the Meridian

BY A. C. CALLEN

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WHEN a compass mounted on a Jacob's staff was the sole instrument used by surveyors the solar attachment, invented and patented by William A. Burt, in 1836, was a satisfactory means for determining the true meridian. It was recognized that the accuracy of the work was greatly increased by using the solar attachment in place of the needle. With the increasing use of the transit as the engineer's instrument it was only natural that the solar attachment should be transferred to it, in an improved and more accurate form.

Engineers are coming to realize, however, that it is difficult to keep the solar attachment in accurate adjustment, that it is an expensive "extra" and means just so much additional weight to carry. If every engineer realized that his transit is sufficient equipment for determining a meridian, doing it more accurately than by means of a solar attachment, it is probable that the use of the latter instrument would soon be obsolete.

With an instrument in good adjustment and by a little practice accurate results may be obtained. I have found that even engineering students, having no surveying experience except that gained in their elementary college work, have been able to secure results correct within about a minute of arc, after they have had a few hours' practice.

The method used is that of direct observation of the sun, which requires that a piece of colored or smoked glass be used over the eyepiece. Instrument makers supply a colored-glass eyepiece that screws on or is used instead of the regular cap. On many prismatic eyepieces there is a colored glass that swings over the opening when solar observations are to be made. If preferred, the image of the cross-hairs and the sun may be thrown on a sheet of paper or the back of a field notebook. Some engineers like this method, but I have not found it as satisfactory as the colored-glass method.

Observation for Latitude—Set up the transit at any convenient point, some time before the sun has reached his maximum altitude—that is to say, some time before true noon. Follow, with the cross-hairs, the upper or the lower edge or limb of the sun until it ceases to rise. The vertical circle will then give the greatest altitude of the observed limb of the sun. This angle is easily obtained, for the sun seems to move horizontally for a few minutes when it has reached its greatest height, and the cross-hair can be accurately set to the limb.

Observation for Determining the True Meridian—These observations should be made between 8 and 10 a.m. or 2 and 4 p.m., if possible. If made earlier than 8 a.m. or later than 4 p.m., the correction for refraction will be large and possibly inaccurate; if made later than about 10 a.m. or before 2 p.m., the sun's change in altitude is so slow that an error of 1 minute in reading the vertical circle will produce a comparatively large error in the result. Proceed as follows:

Set up the transit at one end or at any convenient

point of the line whose bearing is to be determined. Having the plates clamped at zero, sight to the other end or to another point of the line and clamp the spindle or lower motion. Then, releasing the upper motion, sight the sun, bringing it, say into the upper left-hand quadrant of the cross-hairs. The sun will appear to be moving rapidly across the field; but, by using both hands to manipulate the slow-motion screws on the vertical and horizontal circles, the cross-hairs can be kept tangent to the sun, as illustrated in Fig. 1 (a). Record the readings of the horizontal and vertical circles and time of taking the observation. Now, quickly plunge the telescope, reverse the instrument and repeat the observation, placing the sun in the diagonally opposite quadrant as shown in Fig. 1 (b) and record the readings and time as before.

It is evident that the average of the readings thus obtained will give the altitude of the sun's center above the horizon, and the horizontal angle between the sun's center and the line at the average time of observation. The double set of observations taken not only tends to eliminate errors in the adjustment of the instrument, but brings the observations to the sun's center. The reason for making the cross-hairs tangent to the sun is that it is very difficult to place the sun in the exact center of the field of the telescope, and much greater accuracy can be secured by observing the sun in opposite quadrants and averaging the results, as explained.

In making latitude observations, also, it is possible to make double readings if the transitman is quick. Then, if the upper limb of the sun is made tangent to the horizontal cross-hair, as shown in Fig. 1 (c), for the first reading, and likewise the lower limb, for the second reading, as in Fig. 1 (d), no correction will be needed to bring the readings to the sun's center. Unless this is done, however, the semi-diameter of the sun, which is nearly 16 min. of arc (varying from about 15° 45" to 16° 17"), will have to be subtracted from the observed reading when observing the upper limb and added when observing the lower limb.

Owing to the refraction of the sun's rays in passing through the atmosphere, a correction for refraction must always be subtracted from the observed altitude of the sun's center before further computations are made. The amount of this correction depends on the altitude of the sun and may be obtained from the following table.

TABLE SHOWING MEAN REFRACTION CORRECTIONS TO BE SUBTRACTED FROM OBSERVED ALTITUDE IN DIRECT SOLAR OBSERVATIONS

Observed Altitude	Correction for Refraction	Observed Altitude	Correction for Refraction
10°	5' 19"	20°	2' 39"
11°	4' 51"	25°	2' 04"
12°	4' 27"	30°	1' 41"
13°	4' 07"	35°	1' 23"
14°	3' 49"	40°	1' 09"
15°	3' 34"	45°	0' 58"
16°	3' 20"	50°	0' 49"
17°	3' 08"	60°	0' 34"
18°	2' 57"	70°	0' 21"
19°	2' 48"	80°	0' 10"

Ascertaining the Sun's Declination—In calculating latitude and meridian from solar observations it is necessary to know the declination of the sun at the time

of observation. This cannot be obtained by measurement with the transit, but must be taken from the Nautical Almanac, or the Solar Ephemeris, which is published each year by practically every manufacturer of surveying instruments and can be obtained from them free of charge. The Ephemeris gives the declination of the sun for each day in the year, at Greenwich (England) noon.

In order to calculate the corresponding declination for any other time or place, it is not necessary to know

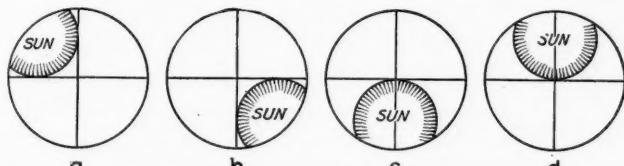


FIG. 1. APPEARANCE IN TELESCOPE WHEN OBSERVING SUN'S DISK

the longitude of the place of observation, as some assume, but only the longitude of the meridian for which the observer's watch is set. "Eastern time" is the standard time of the 75th meridian west of Greenwich; "Central time," of the 90th meridian; "Mountain time," of the 105th meridian; and "Pacific time," of the 120 meridian.

Since 15 deg. of longitude corresponds to one hour of time, it is evident that Eastern time is 5 hours behind Greenwich time, as the sun appears to move from east to west. In like manner, Central time is 6 hours, Mountain time 7 hours and Pacific time 8 hours slower than Greenwich time. To find the Greenwich time corresponding to standard time at New York, Chicago, Denver or San Francisco, it is necessary therefore to add 5, 6, 7 or 8 hours to standard time, in those localities, as indicated by the observer's watch.

Suppose, for example, it is desired to find the declination of the sun at 10 a.m. at Pittsburgh (Eastern time), May 30, 1918. This is equivalent to 3 p.m., Greenwich time. The Ephemeris gives the sun's declination, at Greenwich true noon, May 30, this year, as N. 21° 41' 28" and shows that this is changing at the rate of 22.8 sec. of arc each hour. For 3 p.m. therefore, since the sun's declination is increasing from Dec. 22 to June 22, the declination will be N. 21° 41' 28" plus three times 22.8", or N. 21° 42' 36", which is the declination at Pittsburgh (or New York, Philadelphia, Bluefield, or any point having Eastern time), at 10 a.m. May 30, 1918. In like manner the declination for any other time or place may be calculated. Or, if desired, the chart devised by J. T. Beard and published in *Coal Age*, Apr. 20, p. 733, may be used instead of the method given above.

Calculation of Latitude—Having determined the altitude of the sun's center at true noon, as already described, and having obtained the declination of the sun for the time and place of observation, as well as the proper correction for refraction from the table previously given, the latitude is found by the following formula:

$$\text{Latitude} = 90^\circ - (\text{observed altitude of sun} - \text{correction for refraction} \pm \text{declination of sun})$$

In *north latitudes* the sign of the last term is positive if the declination is south, but negative if it is

north. In *south latitudes*, the sign is positive if the declination is north, and negative if it is south.

Example—Observation taken at noon (Eastern time) at Morgantown, W. Va., May 30, 1918:

Solution—

Observed altitude of lower limb	71° 50'
Add the semi-diameter of the sun	16'
Altitude of sun's center	72° 06'
Subtract correction for refraction (Table)	21"
Corrected altitude of sun's center	72° 05' 39"
Declination (Ephemeris), Greenwich noon,	21° 41' 28" N.
Noon, Morgantown, equals 5 p.m. Greenwich.	
Add correction 5 (22.8")	1' 54"
Subtract declination at time of obser- vation	21° 43' 22" N.
	50° 22' 17"

$$\text{Latitude} = 90^\circ - 50^\circ 22' 17" = 39^\circ 37' 43"$$

Calculation of the True Meridian—The following formula gives the azimuth of the sun at the moment of observation.

$$\cos A = \pm \frac{\sin d}{\cos h \times \cos l} \pm \tan h \times \tan l$$

A = Azimuth of the sun at time of observation;
d = Declination of sun at time of observation;
h = Altitude of sun's center corrected for refraction
(Table);

l = Latitude of place of observation.

In this formula, the sign of the first term is positive if the declination is north, but negative if it is south. The sign of the second term is positive if the latitude is south, but negative if it is north. The value of $\cos A$, as found by the formula, will generally be negative,

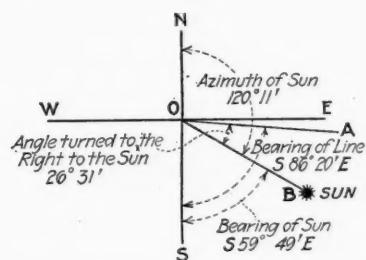


FIG. 2. DETERMINING TRUE BEARING OF SURVEY LINE BY OBSERVATION OF SUN

though it may be positive. However, the trigonometric rules for this sign will always determine in which quadrant the angle *A* lies.

Inasmuch as many engineers are somewhat rusty on the fine points of trigonometry it may be well to state the following rule: If $\cos A$ is negative, the bearing of the sun denoted by the angle *A* is southeast when the observation was made in the morning, in north latitudes; but southwest if made in the afternoon. If, however, $\cos A$ is positive, the bearing of the sun is northeast when the observation is made in the morning, in north latitudes; but northwest if made in the afternoon.

Example—Let it be required to determine the true bearing of the line OA, in Fig. 2, from the following notes obtained by direct observation of the sun, April 13, 1918, in latitude N. $41^{\circ} 54'$, longitude, 90° W.:

Quadrant	Angle AOB	Vertical angle	Time
Upper left,	$26^{\circ} 20'$	$40^{\circ} 15'$	9.43 a.m.
Lower right,	$26^{\circ} 42'$	$41^{\circ} 45'$	9.47 a.m.
Average (sun's center),	$26^{\circ} 31'$	$41^{\circ} 00'$	9.45 a.m.

Solution—

$$9.45 \text{ a.m. } (90^{\circ} \text{ W}) = 3.45 \text{ p.m. Greenwich.}$$

Declination, noon Greenwich,

April 13, 1918,

Add Correction, $3\frac{3}{4}$ (54.6'')

N. $8^{\circ} 51' 02''$

3' 25''

Corrected declination (d)

N. $8^{\circ} 54' 27''$

Altitude sun's center,
Subtract correction for re-
fraction, (see table)

41°

0.1' 07''

Corrected altitude (h)

40° 58' 53''

Latitude (l)

N. $41^{\circ} 54'$

Substituting these values, $\sin d = 0.1548$; $\cos h = 0.75492$; $\cos l = 0.74431$; $\tan h = 0.86872$; $\tan l = 0.89725$ in the formula previously given, we find

$$\begin{aligned} \cos A &= \frac{0.1548}{0.75492 \times 0.74431} - 0.86872 \times 0.89725 \\ &= +0.27561 - 0.77946 = -0.50385 \end{aligned}$$

The azimuth of the sun is therefore $120^{\circ} 11'$; or, according to the rule previously given, the bearing of the sun is S $59^{\circ} 49'$ E ($180^{\circ} - 120^{\circ} 11' = 59^{\circ} 49'$). Since the angle AOB, turned to the right to the sun from the line was $26^{\circ} 31'$, the true bearing of the line OA is S $86^{\circ} 20'$ E ($59^{\circ} 49' + 26^{\circ} 31' = 86^{\circ} 20'$).

It may be noted that there are several instruments on the market, which are either straight or circular slide rules, made for the purpose of solving a formula for the azimuth of the sun. Their use does not appreciably lessen the labor of making a meridian determination, however, as the readings must be made with the transit and the declination and corrected altitude of the sun determined as just described. In my opinion, it is questionable whether it pays to purchase one of these contrivances when a five-place table of trigonometric functions will be more accurate and less costly.

When the clocks have been set to accord with the "Daylight Saving Law" it is important to remember that one hour should be subtracted from clock time to give the standard time used in computing the sun's declination.

The velocity of chemical reaction increases with rise in temperature. At ordinary atmospheric temperatures the oxidation of carbon monoxide and hydrogen proceeds so slowly that the velocity of reaction can not be measured. At high temperatures and with thorough mixing, oxidation takes place rapidly; that is, the gases burn.—Bureau of Mines Bulletin No. 135.

Where the Coal We Produce Is Consumed

The United States Geological Survey is quoted by George S. Rice, in his "Review of the Coal Situation of the World," read before the American Institute of Mining Engineers at the February meeting, and he has furnished us the following table which gives some further details for the benefit of those who have not seen the original computation:

CONSUMPTION OF BITUMINOUS COAL IN THE UNITED STATES, 1915

Purpose	Tonnage Short Tons	Per Cent.
Industrial steam uses	143,765,500	33.0
Railroads	122,000,000	28.0
Domestic purposes and small steam trade	71,336,489	16.0
Beehive and byproduct coke	61,832,898	13.6
Exports	18,773,782	4.0
Mines for steam and power	9,798,681	2.0
Bunker coal (ocean and Great Lakes)	10,707,507	2.3
Manufacture of coal gas	4,563,579	1.0
Miscellaneous	714,073	0.1
Totals	443,492,509	100.0

Minecdotes

500 Volts Versus 250 Volts

There has always been a rather strong tendency among engineers to use 500 volts for a mine-locomotive haulage system in preference to 250 volts, owing to the great saving in copper and the better voltage regulation that is obtained.

A few years ago a well-known engineer with one of the large electrical manufacturers was emphatic in his advocacy of 500 volts for mine-haulage systems, feeling that there was practically no more personal danger than when 250 volts were used. This engineer was exceeding prolific in the use of a certain class of the English language more commonly known as "French." In fact, he could put the average oldtime Irish labor boss to shame in a short space of time.

During a visit of a number of engineers to a mine located in the vicinity of Johnstown, Penn., the party was inspecting the haulage system inside of the mine when the engineer mentioned above passed from one side of the track to the other. His hat being off, his bald head brushed the 500-volt trolley wire; and the ground being wet, the result can be imagined. Some exceedingly rapid action then took place, the mud flying about in all directions.

The engineer landed up against the rib, glared at the trolley wire and then cut loose. He kept going for about 15 min. without repeating himself, and the miners working in the vicinity, although hardened to nearly any kind of language, just stood around with their mouths open in amazement. Later, at the superintendent's office, when the incident was all but forgotten, a delegation of miners came out of the mine and asked the superintendent if that man who knew how to talk was gone; and if not, they would like to hear him talk some more.

Needless to say, after the foregoing experience the engineer strongly advised that 250 volts was the maximum which should be used for mine haulage under any conditions.

Marcus Screen at Plants of the Carnegie Coal Co., Pennsylvania

BY RICHARD G. MILLER*

Chicago, Ill.

IT HAS been said that the most vital question before the American people today is the coal problem. Authoritative opinion asserts that the labor and transportation questions are the principal difficulties in the mining and distribution of coal. Over 100,000 coal miners are subject to the draft, so that the industry is facing a serious labor problem. Moreover, according to estimates, 100,000,000 more tons of coal will be required during 1918 than during 1917, for carrying on our war program and continuing our national life. Under the existing circumstances these 100,000,000 more tons of coal likely will not be forthcoming, so it remains for us to do what we can in order that we come as near to meeting the requirements as possible. It will therefore be necessary to make the greatest use of efficient machinery and labor-saving devices in our attempt at this goal.

Transportation or the lack thereof received a good share of the blame for past and present conditions, and no doubt the car-shortage problem has to a greater or lesser degree affected the shortage of labor. Furthermore, the shipping of dirty coal not only compels the railroads to haul useless material, but it decreases the efficiency of industrial plants as well as the railroads, by reason of the increased percentage of refuse in the coal. This decrease in efficiency is not only due to the low heat value of the dirty coal, but also to the additional expense necessary for handling the larger quantity of ash.

There is a difference of opinion among people with regard to who is most responsible for this larger percentage of refuse in the coal. Some think it is due to the defects in the producing organization, while others think that the miners are more to blame. However, the blame in many instances, no doubt, should be shared by both.

METHODS OF REMOVING IMPURITIES

In some localities mining conditions are such that it is not advisable or practical to attempt to eliminate all the removable refuse at the face; while there are many instances where coal, devoid of rock or slate, could readily be delivered to the tipple or screening equipment. However, operators have an opportunity at this time to manifest their patriotism and provide themselves, where necessary, with adequate means for removing as large a percentage as possible of the slate, rock, bony coal or sulphur balls from the good coal at the tipple before loading into the railroad cars.

Of course, each particular mine has its own set of conditions to consider in determining just what methods should be provided for producing a coal with a minimum percentage of ash. All the measures adopted

should be made fully adequate to the task to be imposed upon them irrespective of the enormous demand for coal, or the price paid for it; the former has run riot, while the latter has been regulated by the Government.

Many operators have had the foresight to include in the design of their plants special machinery and equipment for improving the quality of their product. Those now in a position to market, and also those who can modify their facilities for marketing a better prepared product, should receive recognition from the Fuel Administration by the granting of an additional price per ton to such operators. The justification for this premium, whatever the merits of a particular case may warrant, will be due to the additional investment required for the special means and the additional labor also required for obtaining the "extraordinarily clean coal."

PROBLEMS IN COAL CLEANING

In deciding upon the type of equipment, many features of existing plants govern the procedure, due to the fact that the impurities in the various coals exist in different forms, and also that in one size they are different from that in another. For example, it may happen that the lump coal at a particular plant carries with it most of the removable refuse either as rock, slate, bone or sulphur balls, while the nut or egg coal at another plant might carry these impurities. It therefore may be necessary in one case to use one method of elimination and in the other case some other method.

If, however, these impurities occur in the finer sizes of coal, a more complex method of improving the quality, such as washing, might be necessary. The coarser sizes at most mines are the grades which could be more easily improved by simpler methods. If a large part of the impurities in these sizes could be picked out by the addition, to existing plants, of a moderate amount of simple picking machinery (especially the Marcus combined screen and picking table), then the necessary additional investment and labor required for manning the improvements would be small in proportion to the improvement in the product.

Coal companies in various localities have adopted picking facilities of one or another type. It is notable at this time to observe that especially in the western Pennsylvania field, such companies as the Pittsburgh Coal Co., the Pennsylvania Coal and Coke Corporation and the Carnegie Coal Co. have adopted the combined screen and picking table as a means of meeting the present situation in the most economical way. This is true both as to the necessary investment of capital and the labor required for producing a coal with the minimum amount of ash without going to the necessity of washing. It is desirable to avoid washing except where the coal is used for coking purposes, in which

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case low ash and also low sulphur are imperative. These and other coal companies who have adopted the Marcus screen are in a position to ship "extraordinarily clean coal" and thereby receive an additional price per ton by obtaining permission from the Fuel Administration.

The organizations mentioned above have, all told, 17 of their properties equipped as stated, but the Carnegie Coal Co., with six operating properties near Pittsburgh, is in a class by itself, having six tipples provided with seven of the Marcus horizontal combined screens and picking tables.

One of these installations is a new plant, while the rest are old plants worked over, the old plants having previously been equipped with the old style gravity bar screens and weigh baskets.

NEW CARNEGIE PLANT

The new plant of the Carnegie Coal Co. is at the Louise mine, illustrated by Fig. 1A and shown diagrammatically in Fig. 1. This plant is unique for the reason that the Marcus screen *A* is designed so that a car of coal is dumped into the dump chute, fed by means of the feeder *B* so that the preceding car of coal remains separate on the screen from the car following and the removable refuse is picked out by pickers after the fine or slack coal passes to the bottom deck.

When the picking operation is completed the coal enters the weigh hopper *G*, the pickings never being weighed, so that the miner in no case is paid for the removable dirt in the coal. Moreover, the speed of the coal on the screen is such, and the arrangement of the screenhouse and the position of the weighman is such, that if a car of coal comes along which contains an extra large quantity of dirt, then the equipment is stopped for an instant—long enough to completely remove all of these visible impurities.

The miners knowing this are therefore more careful not to waste their time filling a car with dirt, because it would be useless to them. It might be said in passing that this design was more or less experimental at the time it was developed, but with only a few minor changes in details after erection it was made to work most satisfactorily.

If Fig. 1 is carefully followed, it will be noticed that the lump coal is delivered by means of the shaker loading boom *I* to the center track, while the nut coal is loaded by the chute *N* to the outside track and the slack coal by the chute *S* to the inside track.

Figs. 2, 3, 4, 5 and 6 are diagrams of the McDonald, Atlasburg, Primrose, Armide and Oakdale plants respectively, all of which illustrate installations at existing tipples. All these tipples, with the exception of the Atlasburg plant, are single Marcus screen installations; the Atlasburg plant is a shaft mine and provided with duplicate equipment.

In Fig. 2 the coal is dumped into a weigh hopper, the weighing and operating mechanism of which is suspended overhead. The reciprocating feeder *B* feeds the coal onto the horizontal screen *A*, after which it passes successively over the slack perforated screen, the blank picking space and then the nut perforated screen.

By this procedure, the fine coal is first removed from the coarser sizes so that the removable impurities can

be more easily seen and removed because of the decreased quantity of coal on the combined screen and picking table. These finer sizes pass to the lower deck, and in the case of the slack coal is immediately loaded into railroad cars on the slack track by the chute *S*; the nut is loaded into railroad cars on the center track by the chute *N* and the lump over the shaker loading boom *I* is loaded on the outside track. The pickers remove the rock, slate, bony coal or sulphur balls, throwing them into the refuse trough *F*, which being rigidly attached to the screen conveys them forward, delivering them by means of the chute *K* to a refuse car for the purposes of disposal.

This arrangement of combined screening and picking machinery gives the most perfect screening and loading facilities as well as a most efficient means for picking. Obviously this design lends itself readily to installation in existing structures, which is quite in its favor, in addition to the greatly improved preparation that is thus made possible.

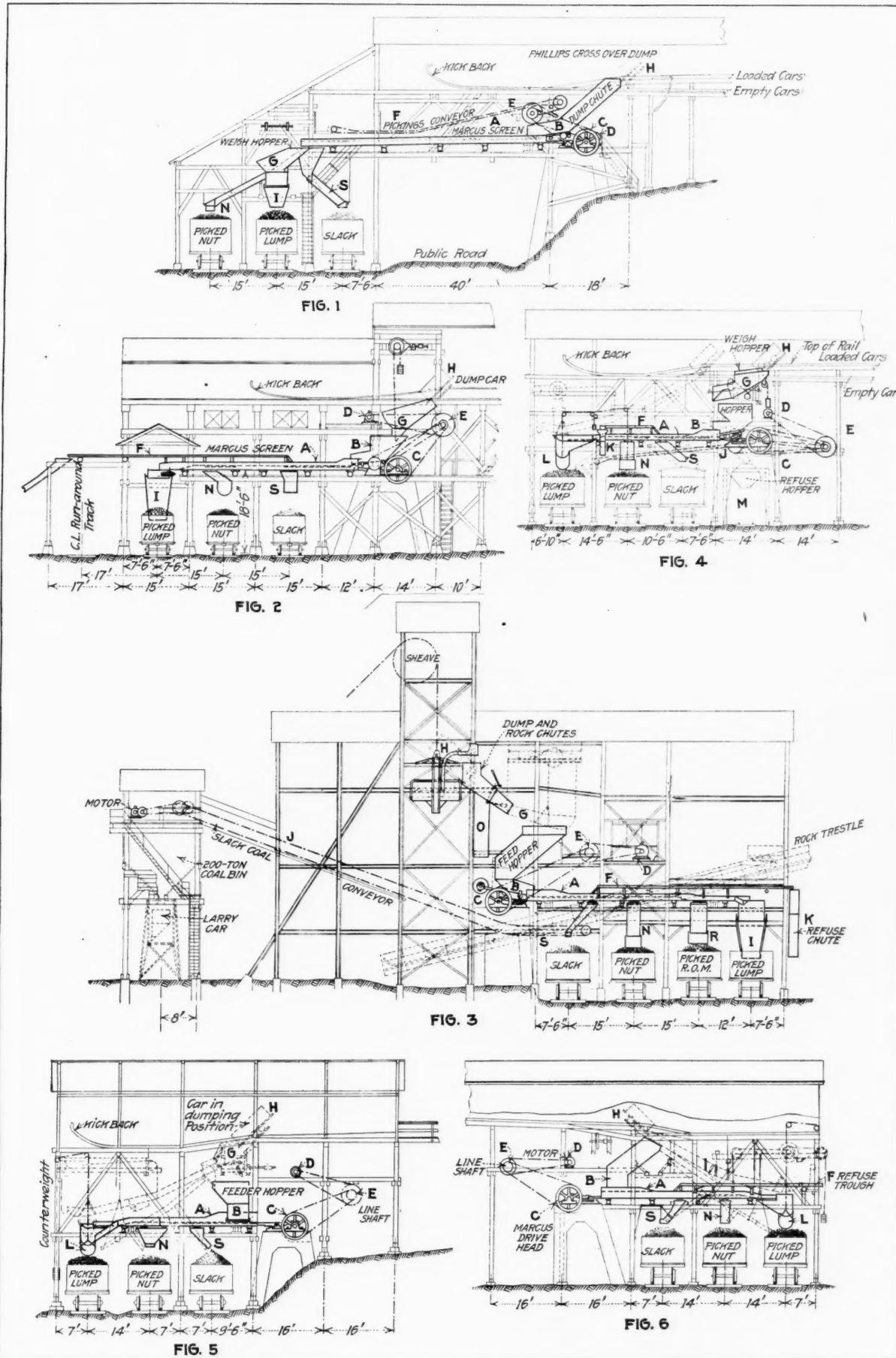
Coming to a discussion of the Atlasburg plant, which is illustrated diagrammatically in Fig. 3, we have an example of a duplicate horizontal equipment as applied to a shaft tipple. The original plant was of steel construction and with slight modifications in it the equip-



FIG. 1A. VIEW OF TIPPLE SHOWN IN FIG. 1

ment readily adapted itself, giving all the advantages of modern screening and picking. The weigh basket *G* was changed to a double bottom discharge type so that it became necessary to furnish a new dump chute designed with doors for the disposition of mine rock by way of the rock chute *O*. The car on the rock trestle carries this to a rock pile not shown in the diagram. From the weigh basket *G* the coal from either or both self-dumping cages is delivered to either or both of the reciprocating feeders *B* and onto the Marcus screens *A*. The operation of these screens is the same as previously described, including the feature of the fixed refuse trough *F* for delivering pickings to the pickings chute *K*.

One point of difference, however, is that this is a four-track equipment, which lends itself to loading lump coal from one Marcus screen over the shaker loading boom *I*; picked run-of-mine or picked egg and lump combined can be loaded on the second track, or vice versa; at the same time slack coal and nut coal can be loaded from either or both screens to the railroad



FIGS. 1 TO 6. PLANTS OF CARNEGIE COAL CO. IN WHICH MARCUS SCREEN HAS BEEN INSTALLED

cars on the slack track by way of the chute *S*; or railroad cars can be loaded on the nut track by way of the chute *N*. This point in the design adds to the flexibility of operation in the case of emergency, which is a valuable asset at any coal-preparation plant. In connection with this installation, also, the slack conveyor *J* can receive slack coal from either or both screens and deliver to the 200-ton coal bin on the left for loading larries to charge the coke ovens. The installing of this equipment at the Atlasburg plant was done without interfering with the operation of the mine or hoisting of coal.

The Primrose plant, as illustrated in Fig. 4; the Armide plant, Fig. 5; as well as the Oakdale plant, Fig. 6, are similar equipments of the same type of machinery which was installed where the old gravity bar screens and weigh baskets were undisturbed. These are shown in light dotted lines, whereas the new equipment is shown bolder. Each is a three-track arrangement making lump, nut and slack coal. Loading booms in these three cases were not required for the lump coal, and the plant illustrated in Fig. 5 is not equipped for refuse disposal as the nature of the coal and preparation required did not demand it.

At Primrose the standard rigidly connected refuse trough *F* is shorter than usual, delivering sideways to the chute *K* into the pickings conveyor *J*. This arrangement facilitates operation by taking the pickings to the rear for disposal; having this fixed refuse trough *F* makes it convenient for depositing the pickings as they are removed from the coal.

The disposal of refuse at the Oakdale plant is done in a manner similar to that described for the McDonald plant, illustrated in Fig. 2. For feeding the screens at Armide and Oakdale, and to facilitate installing them without disturbing the existing bar-screen equipment, the feeders in these two cases were placed at right angles to the screen, which will be noticed by observing the diagrams.

The principal thing to bear in mind in considering these installations, which are intended to facilitate removing the refuse as well as to improve screening, is that in each and every case the fine coal is screened from the run-of-mine coal before any picking is done. This leaves the coarser sizes by themselves and in lesser quantities, so that pickers can see the bone, slate, rock or sulphur balls and therefore can better remove them.

Another big advantage, and this is that after picking is accomplished the finer sizes, screened out at the start, travel to the front end of the screen by closing the slide gates on the bottom deck; here they combine with the picked coarser sizes, giving a picked run-of-mine product mixed as uniformly as it was before the separation at the start of the process.

It is obvious that coals with a large percentage of slack, therefore, are the ones most conveniently picked by this method. For the general run of cases it is a more efficient method as regards operation, because usually about one-third of the run-of-mine coal is black which passes to the lower deck of the Marcus, relieving the picking operation therefore of one-third of the volume of coal. Furthermore, after the coal on the screen passes the nut perforations the egg and lump in lesser volume are more easily picked; after the egg coal passes through the egg screen, the lump coal alone re-

mains and can be picked just before it reaches the lump chute or loading boom.

Every engineer interested in the preparation of coal in all probability has at one time or another felt the need of a combination arrangement whereby coal could be simultaneously cleaned and screened, and it therefore seems strange that until recently a device of this sort had not been developed.

It has been approximately four years since the Marcus combined screen and picking table was introduced into the United States. Previously to that time it had been thoroughly tried out in foreign countries, including among others England, Germany, Algiers, Borneo, Japan, South America, Mexico and Canada.

At the present time in the United States there are more than 100 of this class of coal-preparation plants in operation and building. It is interesting to note that the application of this device has been very general, applying itself to all classes of bituminous coal, including the harder, medium and softer grades as well as the lignites and semi-bituminous coals. These plants are in operation from Wyoming to Pennsylvania and from North Dakota to Alabama.

The installations described and illustrated, and as put in operation for the Carnegie Coal Co., were all designed and built by the Roberts & Schaefer Co., of Chicago, Illinois.

Some New Ideas in Coal Storage

A recent article by Prof. George Knox, published in the Journal of the Monmouthshire Colliery Officials Association, while it advises that no slack coal or mixed small coals be stacked to a height of over 13 ft., urges that coal for coking purposes should not be piled more than 4 ft. deep, for slight heating renders the coal unfit for coking purposes.

Professor Knox adds that inferior coal should not be mixed with the better varieties. "Rashings" or other friable bituminous shale bands should be removed as far as possible. Coal should never be stacked behind wooden structures, on moist vegetable soils or on ground covered by coarse vegetation. Mr. Knox does not say why the vegetation is objectionable, but it may be because it has in itself a great tendency to heat. It probably does not have any direct, or chemical, effect on the coal.

Where "Byproductless" Ovens Waste Coal

The following tabulation has been made from the enumerations of ovens in the various states of the union, as made by *The Coal Catalog*:

State	Beehive Ovens	Rectangular Ovens	Total Ovens	Per Cent
1. Pennsylvania	45,523	3,185	48,708	57.41
2. West Virginia	16,511	.....	16,511	19.46
3. Alabama	6,111	.....	6,111	7.20
4. Virginia	5,082	.....	5,082	5.99
5. Colorado	2,994	.....	2,994	3.53
6. Tennessee	2,003	.....	2,003	2.36
7. Kentucky	875	150	1,025	1.21
8. Utah	874	.....	874	1.03
9. New Mexico	817	.....	817	0.96
10. Washington	232	.....	232	0.28
11. Oklahoma	200	.....	200	0.24
12. Ohio	178	.....	178	0.21
13. Illinois	104	.....	104	0.12
	81,504	3,335	84,839	100.00

The number will probably decline from this time onward, as the byproduct oven will doubtless drive out the "byproductless" oven in a few short years.

Coal Production and Lubrication

BY REGINALD TRAUTSCHOLD
New York City

SYNOPSIS—*The greatest problem in coal production, outside of railroad car supply, is transportation from the face to the tipple. Heretofore a cheap grade of fluid, black oil, has been used in large quantities. Much of this has dripped or run out of the bearings without performing the service for which it was used. More modern semi-grease compounds have in service given much better results.*

A RECORD production of bituminous coal, an anthracite output close to normal, and the prospect that the car shortage will soon be relieved go far toward removing some of the pessimistic forebodings of a few weeks ago. Although these conditions seem to have engendered a feeling of optimism for the time being, the growing scarcity of labor is, nevertheless, viewed with much disquietude.

This mixture of emotions is further enhanced by the discouraging reports from the anthracite fields. In certain mines, despite the fact that the number of persons engaged in production of coal has increased, there has been a marked diminution in output. This decrease in labor productiveness is explained by poor attendance. Absences on the part of the workers ran from 8 to 15 per cent.

A production of coal decreasing more rapidly than the available labor supply would be a calamity to the country, yet the report from the anthracite field would appear to indicate such a possibility. To guard against this, and to secure a material increase in production with the growing scarcity of labor is one of the country's vital problems, to realize which every ounce of energy and precaution must be expended. Coal production must be increased in spite of the labor situation and this can only be accomplished through material improvements in present-day conditions.

SHOULD USE EVERY AVAILABLE MECHANICAL AID

Every effective mechanical aid must be pressed into service. Unnecessary absences must be prevented, the efficiency of the workers must be increased and this can be realized by placing more and more dependence upon mechanical assistance and by decreasing the manual efforts required of the miners and their helpers.

The more general use of mining machines, mine-car loaders and the numerous other mechanical aids of proved value now on the market will all materially assist in securing coal with a minimum amount of labor. Production in a mine employing adequate mechanical aids resolves itself, to a considerable extent, into a problem of expediting and facilitating the movement of mine cars from the face of the coal to the tipple.

The gradual withdrawal of the time-honored mine mule to the more urgent work on the battlefield and behind the lines—work for which “Maud” appears to be particularly qualified, and for which she must be spared—necessitates the installation of mechanical systems of

mine-car haulage. The passing of the mule tends to cut down the number of persons required, since by locomotive longer trains can be handled. In this way the changed conditions tend to adjust production to reduced labor supply. It is not enough, however, that production be maintained in spite of a decrease in the working force; it must be materially increased.

Speed of passage through the haulageways and facility in moving the cars are thus essential if the gains in output which can be secured at the face are to be fully realized and effective advantage taken of the speed with which the cars can be dumped at the shaft bottom or on the tipple. The problem is primarily one of improvement in rolling stock, and any modification, practice or installation which will lighten the labor of handling the mine cars must be adopted. Obviously, the first step in this direction is a complete overhauling of all mining equipment, the equalization of grades and, of chief importance, the securing of proper lubrication.

IMPORTANCE OF LUBRICATION IN COAL MINING

How important the question of lubrication is to a coal mine may be judged from the quantities of lubricants annually consumed. In one anthracite mine with an annual output of somewhat less than 4 million tons, close to 50 tons of grease were required and some 53,000 gal. or more of liquid lubricants. Starting from the power house, proper lubrication is required for every piece of moving equipment—engines, pumps, etc.—but the major amount of lubricant is employed for the mine cars. At this particular mine, which is typical of the great majority of such operations throughout the country, 60 per cent. of the total lubricant consumed was car oil. Thus, about 0.0136 gal. of car oil was used for every ton of coal mined.

Obviously there is here an important opportunity for economy in the use of lubricant and an accompanying saving in the attention which must be given to mine cars. No such quantity of lubricant would be required if it effectively discharged the service for which it was supplied. Not only can a lubricant be ineffective, but a considerable amount of time may be consumed in the frequent refillings that such lavish use necessitates. Quite aside from the questionable economy of such lubrication is the consideration of the labor required in feeding the oil to the journal boxes or bearings.

Heavy railway cars require replenishment of lubricant only every 1000 to 3000 miles, while mine cars are considered to be giving good service when they average 50 miles per oiling. Emphasizing still further the inefficiency of ordinary mine-car lubrication is the fact that from one-quarter to one-half the power generated at the colliery is used for mine haulage.

The car oil in use at the mine under consideration, as in many others throughout the country, was “black oil.” This lubricant is employed chiefly because it is cheap. Much of it drips from the bearings without performing any useful work. Tests have shown that when such oil is used for mine-car lubrication, from 50 to 90 per cent. of it is wasted. Any such inefficient lubrication would

not be tolerated outside of a mine, and the use of this oil is here accepted solely because it has always been considered the suitable lubricant. This is an example of the blind acceptance of dangerous traditions.

Not only is from two to ten times as much "black strap" as is effective in combating journal friction required when using such oil for lubrication of mine cars, but the dripping oil is apt to fall on the track and cause a lack of grip of the driving wheels on the rails. The floors of the haulageways become oil-soaked, making footing insecure and materially increasing the already high fire risk of a coal mine. The use of any lubricants that are easily volatilized should be prohibited, particularly when other far more stable and effective lubricants are easily obtainable.

A mine-car lubricant in order to be considered satisfactory today must be one of high lubricating value, unusual tenacity—a tenacity equal to that of a high-grade grease in order to guard against drippage and to prevent its being squeezed out of the bearing under load; impervious to acid and alkali solutions or fumes with which it may come in contact and of lasting qualities in order to economize in labor for lubricating. These exacting requirements, important as they are at any time, are infinitely more so at present if the coal demands of the country are to be met. The use of such a lubricant (which is now obtainable) would cut down the frequency of lubricating periods to one each three to six months, reduce the tractive force required to start and move mine cars and greatly improve operation.

PROPER LUBRICATION A MATTER OF TEST

General lubricant requirements for bettering the operating conditions have been enumerated before taking up the more specific requirements imposed by the type of mine-car bearing or journal construction, in order to emphasize the necessity of exercising great care in the selection of lubricants. The construction of the bearing should be given proper consideration in selecting the most effective lubricant. A lubricant best suited for a roller-bearing construction, for instance, does not prove to be the best suited for the lubrication of a plain-bearing wheel.

The importance of bearing construction on lubrication was appreciated even when an oil was recommended which could be wasted without entailing a heavy monetary loss.

The bearing and journal constructions employed for mine cars affect primarily the amount of tractive force required for their movement. The effective operation of the existing mine rolling stock is now of more importance than the immediate installation of more efficient running gears. All available mine cars must be put into service, operated to the best possible advantage, and the lubrication of any type of bearing construction not allowed to jeopardize the rate of handling coal by cars equipped with other types of running gears. That is, the evils incident to the use of lubricants readily affected by changes in temperature, whether these be climatic or originate in the bearings, must be avoided.

For mine cars, a lubricant is required that will not drip, spatter or climb, one with the tenacity of a high-grade grease, but without its failing of having to melt before it can function. These exacting requirements are possessed by certain products now on the market,

the products of specialists who have made an intimate study of the lubrication requirements of mine cars and the conditions under which effective service has to be discharged.

In many instances the trucks of the mine car may pass through water, necessitating an insoluble lubricant. Frequently this water is strongly charged with acid or alkali, under which conditions the lubricant must be impervious to the action of such solutions. Gases and fumes of a penetrating and corroding nature are also sometimes encountered, and the lubricant must resist the attack of such mediums and be able to protect the bearing surfaces from them. It is imperative, also, that the lubricant possess lasting qualities, for the lubrication of mine cars should be unnecessary more than three or four times a year.

Any mine-car lubricant that fails to function effectively under any of these conditions possesses a failing which may cause an interruption to the continuous and rapid movement of cars necessitated by the intensive operation of the mine. The requisite lubricant must be one which will not fail in its service under the most trying conditions. It should be, then, a special product of a lubricant manufacturer with wide experience in the specialty field. Among such products are the Slo-flo lubricants made by the Swan & Finch Co., of New York.

The lubrication of plain car wheels or journal boxes calls for a lubricant of the consistency of a medium grade of cup grease when reduced to lubricating consistency. The grade of the above lubricant best suited for this service is classified as No. 28. This is also admirably suited for use with solid roller bearings, since its consistency is sufficiently free flowing as not to interfere with the effective functioning of the rollers and at the same time is of sufficient body to withstand the heavy "squeegee" action of the rollers on the bearing surfaces of the shaft and cage.

For securing the best efficiency from the distinctive hollow roller construction of the Hyatt bearing, a slightly lighter lubricant is advisable. The hollow rollers act as reservoirs for the storage of lubricant and the helical flexible construction—alternate rollers wound in opposite directions—causes the lubricant to be distributed continuously over the bearing surface, first in one direction and then in the other. This wash back and forth assures even and continual lubrication of bearing surfaces, permitting the use of a more free flowing lubricant than could be advisably employed for bearings with the ordinary solid type of roller. The grade developed for use with the Hyatt construction of bearing is No. 27.

The use of either of the two grades of lubricant specifically mentioned, or that of any other particular brand or grade, cannot as a matter of course assure an increase in coal production. As aids toward such an end, however, they are extremely valuable. Coal can be cut with mining machines to meet almost any demand, despite the growing labor shortage; almost any capacity can be handled on the tipples, prepared for the market and, it is hoped, dispatched to distributing points and industrial centers. The vital consideration now, therefore, is to expedite the movement of the coal from the face to the tipple. And in this connection proper lubrication plays an exceedingly important part.

DEPARTMENT OF HUMAN INTEREST

Using Moving Pictures for Education

The Bureau of Commercial Economics, Washington, D. C., has the germ of a great idea, an idea which it is impossible to put immediately into complete execution, but one which is to be welcomed even in its initiatory stages. It is to prepare a series of moving pictures for the education of the public and the individuals in industry and to give through the eye the impressions which the tongue fails to convey because of its restricted powers of expression and because of the barriers set up by the many different languages of the diverse peoples who have thronged within our gates.

The bureau has already a coal film. It is not to all appearance well adapted to the teaching of mining, but it does, at least, show the importance of the industry in the present juncture. That is a message well worthy of the telling. The mine worker needs to realize the fact that his industry is basic and necessary to the proper conduct of the war.

Under the head of "mining" in the coal film is shown prospecting, boring, mine construction, operation of breakers, the loading of railroad cars, the shipment of coal, distribution and storage. Similarly the "oil refining" film illustrates the boring, casing, piping and tanking of oil, and the "refinery" film shows the separated products, the barreling of oil, pipe-line transportation and storage.

Other pictures give the mine worker an idea of the vast number and variety of the products made from coal, including, of course, in this such explosives as picric acid and trinitrotoluol. Thus they give him a realization of the dependence of the country on his active labors and in this manner stimulate his patriotism and urge him to larger service.

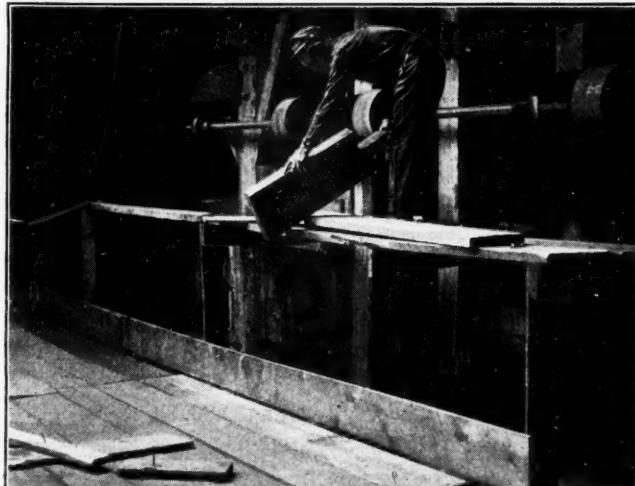
The Bureau of Commercial Economics is prepared to loan to any coal company any of its films. It does this through the various coöperating universities situated

all over the country, which act as service stations to any coal organization requiring the use of them. No charge is made for the service except for transportation charges from and to the distributing center.

The bureau requires that the films be shown on a standard motion-picture projector and manipulated by an experienced operator. It expects a report of the films shown and the number of persons who see them, and it further stipulates that no admission fees be charged when the film is shown. A booklet has been prepared by the bureau giving a partial list of the available subjects. The institution is maintained by voluntary subscriptions and annuities on which it depends for an extension of its activities.

May Injured Employees Select Doctor?

The question of a coal company's liability for the doctor bill of an employee who refuses to avail himself of the services of the company's physicians and engages his own is involved in two writs of certiorari which have been obtained at Carlinville, Ill., by the Superior Coal Co. One is against Samuel O'Neil and the Industrial Commission of Illinois and the other is against John O'Berta. O'Neil was injured in the company's mine Oct. 16, 1917. Although the company had five physicians at Gillespie and two at Benld, and the employees had been so notified, O'Neil consulted others and their bill of \$44.70 was presented to the arbitrators of the Industrial Commission and the company was notified to pay it. The company in the writ raises the objection that allowance of the bill is against the provisions of the compensation act. The circumstances in the O'Berta case are the same. His doctor and hospital bill is \$97. He also filed a claim for \$156 for wages lost and afterward raised this to \$1731. The company claims all these charges are against the provisions of the compensation act.



WHEN WILL WE LEARN THE EVER-PRESENT DANGERS OF THE UPTURNED NAIL AND OF THE THIN WELL-WORN SHOE SOLE?



Courtesy of "The Anode"



Unforeseen Coal Demands Drain Supply

Rapid increases in the demands being made on this country's coal supply are viewed with growing alarm at the Fuel Administration. Not a week passes that does not see a new or an additional requirement which had not been included in former estimates. A recent call for coal for use in France and another to take care of an English obligation in Chile are the latest types of demand of which no previous calculation had been made. It is this continual drain on our supplies which is spurring both the production and the conservation division to their maximum effort.

Some see hope in the fact that both France and England have been able to increase their production materially after the first two years of war, during which production declined considerably. While coal production in the United States increased 10 per cent. during our first year of war, and promises to increase another 10 per cent. this second year, it may be possible to make even a larger proportionate increase next year. Since it was possible for England and France to attain important increases in production after sufficient time had elapsed to permit of more thorough organization of the industry, it is reasoned that we, too, will find ways and means of mining coal in greater volume.

High Production in Many Districts

Production records are being made in many coal districts. Alabama, during the week ended July 13, produced 412,478 tons. The previous high record for the district was 379,737 tons. The Big Sandy and the Elkhorn districts of Kentucky report the production of 157,996 tons during the same week. The best previous performance was 137,993 tons. Central Pennsylvania exceeded its previous high record of 1,175,883 tons by 150,000 tons. The Uniontown district of Pennsylvania exceeded the best previous record by 8000 tons.

Dealers Fail to File Weekly Reports

Railroad station agents are to divert coal consigned to dealers who have not filed weekly reports with the Fuel Administration. July 1 there were 750 dealers in New England who were delinquent in their reports. They were given until July 10 to get them in. All but 70 complied. Of the number to whom all shipments were denied, 37 are located in Maine, 20 in Massachusetts, 5 in Rhode Island, 3 in Connecticut, 3 in New Hampshire and 2 in Vermont.

Ohio Distributor's License Revoked

John W. Moore, of Columbus, Ohio, has been deprived of his fuel distributor's license for the violation of the regulations with regard to the distribution of coal. The Elk Coal Co., of which he is president, has been ordered to refund several thousand dollars which it had collected in commissions on transactions which had been carried on under the license issued personally to its president.

Lightless Nights Again in Effect

Thousands of tons of coal will be saved, it is estimated, by the new lightless night order. For four days of the week—Monday, Tuesday, Wednesday and Thursday—the New England states, New York, Pennsylvania, New Jersey, Delaware, Maryland and the District of Columbia have been ordered to discontinue the use of all illuminating signs and lights used for the external ornamentation of any building. In all the other states lightless nights are to be observed on Monday and Tuesday of each week. Roof gardens, outdoor restaurants and outdoor moving picture theaters are excepted in all sections.

All public lighting is to be reduced to that necessary for safety. Certain standards will be arrived at so that the local officials of the Fuel Administration will be able to secure the same degree of compliance throughout the country.

The Bureau of Standards estimates that 500,000 tons of coal are used in generating the electricity required for advertising purposes. Advertising lighting in New York City is responsible for the consumption of 16,000 tons per year.

To Increase Anthracite Supply to New York

During April, May and June New York City received slightly more than its allotment of anthracite coal. Movement into New York is to be increased as much as possible during the next three months, so as to cut down the amount which it will be necessary to handle after the coming of cold weather.

New England Hard Coal Shipments

During April, May and June 3,250,000 tons of anthracite moved into New England. The total which must be moved during the coal year is 10,331,000 tons. It is the aim of the Fuel Administration to move two-thirds of the total before the winter season begins.

Limits Use of Smokeless Coal

Smokeless coal passing into consumption by way of the Lake docks must be used solely for the manufacture of illuminating gas, byproduct coke or coal briquettes. If a specific case should arise where it is imperative to use low-volatile coal for another purpose, a special permit may be issued by the district representative of the Fuel Administration.

To Receive Preference in Anthracite

Communities which would experience the greatest inconvenience in changing from anthracite to bituminous coal are to be given preference in allotting the supplies which have been portioned out. This policy of the Fuel Administration became known when fuel administrators in Michigan, Ohio, Indiana and Illinois were given instructions as to how each state's proportion of anthracite is to be allocated.

To Cut Off Fuel Supply from Consumers Who Fail to Answer Questionnaires

It is feared at the Fuel Administration that it is going to be necessary to take drastic steps to secure responses from the questionnaires recently sent to consumers. Experience at the Fuel Administration has demonstrated that the most practicable way of securing compliance from the dilatory ones [redacted] to cut off coal supply. Since a great deal depends on the conclusions which must be drawn from the information asked of the consumers, there will be no hesitation in diverting their coal supply until the data requested are furnished.

Many Applications for Opening New Mines

So great has become the demand for a more lenient policy in the matter of granting permits for the opening of new coal mines, that a survey of the situation is in progress. More than 500 applications for permission to open new mines have been received by the Fuel Administration in the last six months. Only a few permits have been granted. Most of the requests have received unfavorable action on account of the fact that labor and transportation conditions in the district where it is proposed to open the mines are such that new operations would be likely to retard present production. It is recognized, however, that the development of new properties should not be retarded too long, and the matter is to be the subject of conferences in the near future between Samuel A. Taylor, the engineer adviser of Doctor Garfield, and interested operators.

Brief Washington Notes

An important part of the funds obtained by the Bethlehem Steel Corporation from the War Finance Corporation is to be expended for coke ovens at the Sparrows Point plant.

The Senate has passed Senator Gronna's bill authorizing the Bureau of Mines to spend \$150,000 in the investigation of lignite coals to determine the practicability of their utilization.

Anthracite Shipments for June

The shipments of anthracite for June, as reported to the Anthracite Bureau of Information in Philadelphia, amounted to 6,867,669 long tons, as compared with 6,887,256 tons in May, and with 7,049,037 tons in June, 1917. These figures show that so far as the total tonnage is concerned, the output is being well maintained, shipments for June being only 19,587 tons less than in May of this year, and 181,368 tons less than in June, 1917, in both of which months the calendar provided 26 working days as against 25 days in June.

The average daily shipments were 271,117 tons in June, 1917; 264,894 tons in May, and 274,707 tons in June of this year. The effect of the labor scarcity is, however, being increasingly felt, as shown in the comparisons of the shipments of domestic sizes, practically all of which are from fresh-mined coal.

In June, 1917, the shipments of domestic sizes, including peat coal, amounted to 4,781,969 tons; in June of this year they fell to 4,498,976 tons, a decrease of 282,993 tons, or about 100,000 tons more than the total decrease last month as compared with a year ago.

In the first three months of the present coal year, beginning April 1, the total shipments have amounted to 20,123,298 tons as compared with 19,558,861 tons for the corresponding period in 1917, indicating an increase of 564,437 tons. The shipments of domestic sizes, however, show a loss of 95,908 tons from 13,375,797 tons in 1917 to 13,279,889 tons in 1918.

The shipments of steam coal, a goodly proportion of which is recovered from culm banks, increased 660,345 tons or over 10 per cent. Distributed by carrier companies the shipments during June were as follows:

	June, 1918	June, 1917	Coal Year, 1918	Coal Year, 1917
P. & R. Ry.....	1,345,079	1,341,370	3,935,469	3,686,981
L. V. R.R.	1,352,820	1,347,205	3,856,311	3,611,595
C. R.R. of N. J.	622,005	632,402	1,717,865	1,775,670
D., L. & W. R.R.	1,015,438	1,085,072	3,061,059	3,069,179
D. & H. Co.	773,691	818,337	2,371,234	2,232,110
Penna. R.R.	482,737	500,037	1,424,491	1,431,403
Erie R.R.	756,257	807,047	2,212,879	2,258,651
N. Y. O. & W. Ry.	186,948	181,965	549,670	506,530
L. & N. E. R.R.	332,694	335,602	994,320	986,742
	6,867,669	7,049,037	20,123,298	19,558,861

Wagon Miners Combine

Between 300 and 400 owners of wagon mines met at Pittsburgh, June 27, and formed the Wagon Mine Owners' Association, the following officers being elected: H. S. Morrow, Frankstown road, Penn township, president; A. Audley Pierce, McKeesport, vice president; R. B. MacPherson, West End; Frederick W. Scott, Fair Haven; D. B. Sober, Tarentum; James L. Steele, Crafton, and F. J. Riddle, Turtle Creek, vice presidents; A. W. Mendel, North Side, secretary, and Hyatt M. Cribbs, Verona, treasurer.

The association so far includes few wagon-mine owners outside of Allegheny County, but the members are anticipating an extension of the list so as to embrace all the wagon-mine owners in Greene, Fayette, Westmoreland and Beaver Counties. A community coal pile will be formed at Pittsburgh. All surplus coal will be stored on this pile, cash being paid for the coal on its delivery. Emphasis is to be placed on the mining of clean coal. An increased rate, above \$2.35 per ton, is to be sought by the wagon-mine owners. D. W. Kuhn, the fuel administrator of Pittsburgh, delivered an address.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Already the work of the production department of the Fuel Administration, backed by the loyalty of the operators, union leaders and mine workers, is attaining results. We used to hope for an output of 12,000,000 tons of bituminous coal a week, and until the week ending June 8 we did not once get it. The output for the week ending July 13 was 10 per cent. larger than that figure. The mines produced 13,243,000 tons; this is equivalent to 688,636,000 tons a year if the speed can in the future be maintained and if it had been maintained during the months past.

Unfortunately, the railroads are not likely to furnish so adequate a service when moving crops or struggling with winter conditions. We must therefore look jealously at the output of the present moment. It is time for effort. Unfortunately, it has to be provident effort—the kind of effort which takes the highest kind of ideals. We can all work when the need immediately presses. A boy will gather wood when the fire is needed to warm up the room, but he is not so keen to cut and stack it for the winter's need.

The anthracite difficulties with regard to conscription do not seem to right themselves. Nothing but official discouragement of the enlistment of miners will keep them from entering the service. The boards will have to supply the protest themselves if they are going to prevent men from leaving the mines for the army and navy. Such half-hearted action in the matter as has been taken by the Provost Marshal's department will not cure the situation. The recent victories will make it even harder than in the past to hold the men at the coal face.

DANGEROUS TO MAKE INDUSTRIAL DISTINCTIONS

Crowder has given the draft boards the right to use their judgment. They are not under orders to put men into deferred classes, but they can do so if they desire, and we are led to understand that no protest to that action will come from headquarters. That is something, but still hardly enough to produce the desired results. One can understand the attitude of the Provost Marshal's department. It would rather treat every industry alike. There are many war industries, and it is hard to distinguish between them.

If the anthracite region is exempted, the bituminous industry will expect exemption on the ground that it is even more a war industry. This is true enough. The only reason why the anthracite region asks for exemption is because, while its product is essential in peace and in war alike, it is suffering more than almost any other by reason of labor shortage. It certainly is far shorter of men than the bituminous region.

There is some hope that some national recognition will be given to miners which will impress on them the importance of their work in the war. This will not be given to all miners; only those who do their part will receive the recognition which will be in the form of a service badge. By some it is expected that the award will be distributed by special committees at the mines guided by the record at the weigh scale.

The Hudson Coal Co.'s Greenwood colliery is located at Minooka, in that region of Bolshevism and labor trouble which lies south of Scranton. Between 800 and 900 men and boys who work at this colliery are on strike to increase the pay of some of the men. The mines closed down tight on July 16. It seems needless to say that no strike was necessary, as a Conciliation Board exists to settle all difficulties by arbitration. A strike is not only an unpatriotic but an extremely expensive way of righting a wrong and extremely wicked way of wronging a right.

James Gleason, organizer for the union, and a member of the executive board, declares the company is justified by its contract and adds that the mine workers are trying to get the Hudson standard raised to the level of that paid by other companies nearby. The regular meeting of the local will not occur till July 30, and the men are not disposed to call a meeting before that date. Meanwhile, at last reports, the strike was continuing.

There are not wanted evidences of the reason for the large tonnage to which we directed attention earlier in this review. Spangler, in Cambria County, central Pennsylvania, near neighbor to Barnsboro, Hastings and Patton, planned to hold a Firemen's Convention and Carnival. The four towns mentioned are all miners' towns, with little else than mining to support them. Had the convention been celebrated the whole section would have been laid idle. Men would have been drawn into Spangler by street car and railroad from far and near, for that region is fairly netted with railroads and trolley lines. James B. Neale, Director of Production, however, urged that the carefully laid plans be abandoned and by telegram came back the response that there would be no Firemen's Convention and Carnival. The affair would have started Aug. 11 and lasted through the week. The Fuel Administration does not approve of festivities of this kind so long as the need for steady work is as marked as at the present.

In northern West Virginia, so long nonunion, unionization is rapidly proceeding without opposition from the Consolidation Coal Co. and other large companies, if not with their active co-operation. There are, as usual, some men who do not desire to join, and some 12 organizers from various parts of the country are busy day and night arguing the benefits of unionization to the convinced and skeptical alike. Mother Jones, who for a while was sent to this region, went to Washington following a celebration at Clarksburg, July 4. The coal operators understand that she will not return to the Fairmont section.

ASKING DEPARTMENT OF LABOR FOR MINERS

Vance Randolph, examiner in charge of the United States Employment Service Free Bureau, recently located at Clarksburg, has orders for 500 men from the Consolidation Coal Co., including miners, machine men, machine helpers, coke pullers, and coke forkers. At a meeting of the Clarksburg Coal Club operators in that immediate vicinity gave him an order for 460 men and yet there were several other operations to be heard from.

In the Kanawha region the speeches made by Major Sandford, of the British army, during the last two weeks have had a potent effect in bringing the miners of that district to a realization of the needs of the war. The soldiers of the pick are now doing their duty as earnestly as the soldiers in khaki.

Miners at a certain mine in Raleigh County, in the Windy Gulf region, went to the manager of the company and informed him that they were ready to forego an eight-hour day and work nine hours, or as long as was necessary.

At Panama, Ill., the United Mine Workers' Union is suffering from the effects of too much prosperity. A scandal has developed in connection with the administration of the union's finances. The recording secretary is missing from Panama and the State Auditor of the organization is making an examination of the books to ascertain how the union managed last year to spend \$59,000 for expenses. The auditors are said to have found numerous irregularities in the issuance and payment of warrants and checks; the amounts on both having been "raised," according to reports. Many checks not regularly signed by the officers of the union are said to have been cashed.

Operators Will Pay for Funerals

On July 8 a resolution was introduced by James Matthews, of Shamokin, Penn., president of District No. 9, United Mine Workers, at a session of the Anthracite Conciliation Board. Its provisions are best set forth in the actual wording of the resolution, because any attempt to rewrite it subjects one to the temptation of adding to its provisions those additional clauses that it was evidently the intention to have inferred or incorporated.

However, it may be permissible to say that while the purpose of avoiding funeral lay-offs is clearly stated, there is nothing in the agreement to make it clear whether a company would be justified in refusing to pay the funeral expenses where all the men decided not to work on the day of the funeral. Nor is the period limited to the time of the war, though the war is noted as cause for the provision.

There is also nothing to show whether the employed members of the family are only permitted to attend the funeral as members of the mine delegation or are not referred to at all in the resolution, their right to presence as members of the family being conceded. These matters should undoubtedly have been covered in the contract. Apparently the mine foreman is only an advisory member of the committee, for the grievance committee of the colliery is sure always to outvote him. Labor contracts should be written carefully. Their meaning should be absolutely above question. Unfortunately, both in the anthracite and bituminous coal regions ambiguity in contracts is quite frequent. The shortness of the contractual term saves the contracting parties from more frequent disputes. As it is, however, there are more than are necessary. This contract reads:

"The Board of Conciliation believes that as a war measure, at a time when public necessity requires a maximum production of coal, there should be no cessation of the operation of mines and collieries on account of the death of an employee caused by an accident or on account of funerals, and to the end that all collieries remain in full operation in such circumstances and in consideration thereof, it be directed that the operators pay to the nearest heir of the deceased employee whose death has been caused by accident the sum of \$150, and in addition thereto directs that the grievance committee and mine foreman elect six representatives of the respective colliery to attend the funeral, it being understood that the six men be selected that will least cripple the operation on that day and that the wages of these six representatives be paid by the operator."

This resolution doubtless was the outcome of an understanding in which not only the members of the board, but the operators also, participated. It was accepted by the board as soon as submitted and it will be regarded in all probability as a part of the contractual obligations of the anthracite region so long as the war lasts. It has been hailed as a example of coöperation between employer and employee, but really it is a breach of contract accepted by the employer under pressure from the employee. The companies yielded easily and gracefully to their employees feeling that they could not let their rights avail anything when the national interests were at stake. The mine workers will do well to remember this and see if they "can go the operators one better" when some little matter that they can correct holds up the progress of the work.

Wages and Practices of Wagon Mines

The bonuses paid by the smaller mines working the less-desirable coal beds have been the cause of much of the high-price coal in central Pennsylvania. Some concerns instead of paying the scale rate of \$1.10 are paying \$1.60 a ton. Even at that figure they cannot get the help they want. It takes more than that to dislodge the workmen from the regular mines where work is conducted under better principles with better equipment and better conditions. And when the men are so dislodged it only aids the inefficient mine to the disadvantage of the efficient operation and of the nation at large.

The wagon mines have been extremely slow in loading railroad cars. Some will order a car placed and then be

10 days or two weeks filling it with coal. There are about 20 concerns in the central Pennsylvania district that will be brought to book under the new fuel regulations which have been promulgated against paying wages above the union schedule. The board of investigations held its first meeting July 5.

The following members have been appointed by the United States Fuel Administrator: John C. Forsyth, Harry Boulton and Charles O'Neill, all of Clearfield, and B. M. Clark, of Punxsutawney. The Central Pennsylvania Coal Operators' Association has appointed as its representatives: Judge A. O. Smith, of Clearfield, chairman; J. R. Caseley, of Dubois; T. V. Gould, of Brisbin; Earl Hewitt, of Blairsville, and M. J. Bracken, of Gallitzin. The alternates of the association's membership are George Nicholson, of Barnesboro; J. A. Bucher, of Beaverdale; C. B. Maxwell, of Morrisdale; H. B. Douglas, of Clearfield, and W. R. Wilburn, of Philipsburg.

Prohibition and Labor in West Virginia

The idleness following Independence Day at the West Virginia mines is acting in favor of prohibitionary measures, and yet, strange to say, it also acts against any such action.

West Virginia is a prohibition state, but it has neighbors that have not signed the pledge—Pennsylvania, Ohio, Maryland and Kentucky. In some sections the dry can migrate to the happy lands with bars, notably in the Panhandle, the Thacker and Kenova districts, the Elk Garden and Upper Potomac regions and the mines north of Fairmont.

But there are regions which are, or should be, as dry as the heart of Arabia—the New River and Kanawha regions, where much carfare must be spent and a long holiday taken if refreshment is needed. Yet the New River region says that Independence Day was over-well celebrated and did not end on July 5.

If, therefore, West Virginia speaks with an uncertain voice it is because different parts have a different experience. The Panhandle, which vainly tries to push a dry finger into the prevailing wetness of Ohio on the one side and Pennsylvania on the other, is convinced that July 4 proved to the hilt that national prohibition is needed.

The West Virginia Panhandle Coal Operators' Association, of which Johnson C. McKinley is president, addressed telegrams last week to Senator Howard Sutherland and Dr. H. A. Garfield, United States Fuel Administrator, expressing approval of Senator Sutherland's support of national prohibition, and recommending to Dr. Garfield the establishment of a five-mile dry zone around coal mines, in case the present movement to establish national prohibition fails.

In the telegram to Dr. Garfield, Mr. McKinley said: "We heartily concur in your belief that increased production of bituminous coal is absolutely essential to the winning of the war and urge your support of the effort now being made to abolish the sale of intoxicating liquor so long as the war lasts. Industrial conditions in West Virginia have improved materially since prohibition became effective in this state, but the coal mines of this section operate at a disadvantage because of the saloons in the border counties of Ohio. In case of failure of the present movement to establish prohibition, we would respectfully urge that a five-mile dry zone be established around coal mines as was advocated by the National Coal Association in October last, but total prohibition for the entire country we believe very desirable at this time."

As already said, New River cannot call on the hospitality of neighboring states and consequently should have observed Independence Day for 12 hours only and then retired decently for a hard day's work on the day following. But it is said that the New River people lost all their enthusiasm for putting out coal during the festivities of the Fourth. At one or two operations, where after Independence Day the operators threatened to put the penalty clause of the contract into effect if the mine workers failed to go to work, the men threatened to go on a strike. In fact, it is said that there are a few leaders in the union, few indeed but enough nevertheless to make trouble, who declare to the Washington authorities that they are loyal, but at the same time discourage the men from doing their best.

Attempt to Guarantee Justice Fails

The lamentable failure of a jury to find a verdict against the persons who recently hanged the inoffensive Robert Paul Prager at Collinsville, Ill., who was murdered simply because he had fallen under the suspicion of the mine workers, was the chief argument presented by proponents of a bill to grant to the state of Arkansas the right to change the venue of trials for men accused of mob and criminal violence. The bill proposed a change of the constitution of the state.

A few years ago, July 17, 1914, Arkansas was the scene of some extremely unfortunate riots. Men were killed and four tipplers were burned at Prairie Creek (see *Coal Age*, Vol. 6, pp. 145, 191 and 270). A few days later another tipple was dynamited at Huntingdon. For this reason Arkansas should realize the need for changes of venue such as will make it easy to deal with general breaches of the peace for which conviction cannot be obtained in a local court owing to the general prevalence of sympathy with the law breakers. Yet despite this fact the change in the constitution, which would have given the law officers of the state this much needed power, was denied by a vote of 52 to 47.

Some Enter Mines to Avoid Draft

Some men in Illinois have been entering the mines to avoid the draft. The underground workings look quite attractive to men of draft age, for they hope that draft immunity will be conceded to those engaged in the production of coal. But the men who enter the mines to evade the draft have little or no intention of working steadily.

Frank Farrington, president of the United Mine Workers in Illinois, has made a statement indorsing Fuel Administrator Garfield's recommendation to President Wilson that draft of miners for the army be stopped. The coal industry of Illinois is, he says, already suffering from a shortage of labor due to the drafting of mine workers. "The draft," he adds, "is taking from the mines the young and agile men who must be depended on to keep the coal moving out of the mines. Tripriders, motormen and mule drivers, who are mostly young men, are fast being withdrawn from the mines by the draft, and a serious shortage will result from any further drafts."

In Canada Draftees Must Work or Fight

Coal mining is classified in Canada as a work of national necessity, and coal miners are treated as a special class in the enforcement of the Military Service Act of Canada. The course to be pursued in regard to the application of conscription to the miners has been a matter of serious consideration to the tribunals of British Columbia and other western mining provinces that are charged with power to grant exemptions, temporary and permanent. The attitude assumed by Judge Thompson of British Columbia recently may be taken as indicative of the generally accepted policy in this respect. In the Crowsnest Pass coal district he was confronted recently with a blanket appeal for exemption for 36 men—the appeal having the backing of the United Mine Workers of America. It was based on the contention that the appellants were engaged in a work of national importance. After hearing all the evidence as to the actual time being worked by each man, the amount of coal produced and the individual earnings, he allowed 31 applications for a limited period, renewal being conditional on the maintenance of an average production of coal by the men whose application for temporary exemption was approved.

In giving judgment Judge Thompson established the following rules:

"1—In cases where I grant exemption it shall be conditional upon the appellant being continuously employed in his occupation, either that in which he is now engaged or some other occupation in the mine. Any person ceasing to work for more than 24 hr. will be deemed to be not con-

tinuously employed, unless he can show some just cause or reason for his nonemployment. This prohibition does not apply to recognized holidays and the holding of funerals.

"2—A lay-off of 24 hr. without just cause or reason being shown shall not occur more than once a month. In case of illness a certificate signed by some medical practitioner must be produced within 48 hr., and if demanded by the military or civil authorities produced and filed in the office of the chief of provincial police at Fernie, B. C.

"3—In the event of a strike or cessation of work by workmen other than exempted men whereby the latter are prevented from working, exemption shall cease, subject, however, to the provisions of rules 9 and 10." (These are certain rules laid down in the agreement subsisting between employer and employee in this district.) Judge Thompson here observes: "This may seem a harsh ruling but it must be remembered that this appeal has been made by the United Mine Workers of America and it will be the duty of the officials of the brotherhood to see that no such strikes or cessations of work occur."

"4—No exempted man shall occupy an official position or carry on work which will necessitate his absence from work at his usual occupation in the mines. In the event of any person to whom exemption is granted desiring to change his employment from one employer to another he may do so upon application being made in writing to me and a certificate allowed by me.

"5—In the event of any dispute arising between the military authorities and any person to whom exemption is granted, or in the event of the military authorities drafting, detaining or arresting an exempted man for alleged noncompliance with these rules, or from any cause, the matter shall be brought before me speedily as possible for determination."

Putting the Slacker on Record

A record of the slackers such as is kept in parts of the anthracite region is to be made in the Connellsburg field. It is not to be a complete record. It will only give the number of days of idleness, not the number of hours of working opportunity lost, but it is a good commencement. It is thought that the record now kept will serve as a basis for future choice between workers.

The material for such a record has in a degree always been available. The bushel record of the loaders was always posted for all and sundry to note and this record was in fact a better criterion of the industry of that class of worker than the record now proposed, while the day record of the day man could always be secured by a perusal of the pay rolls. But now a record is to be made for each worker and care will be taken to ascertain in every case of absenteeism whether the absence was accompanied by an acceptable excuse.

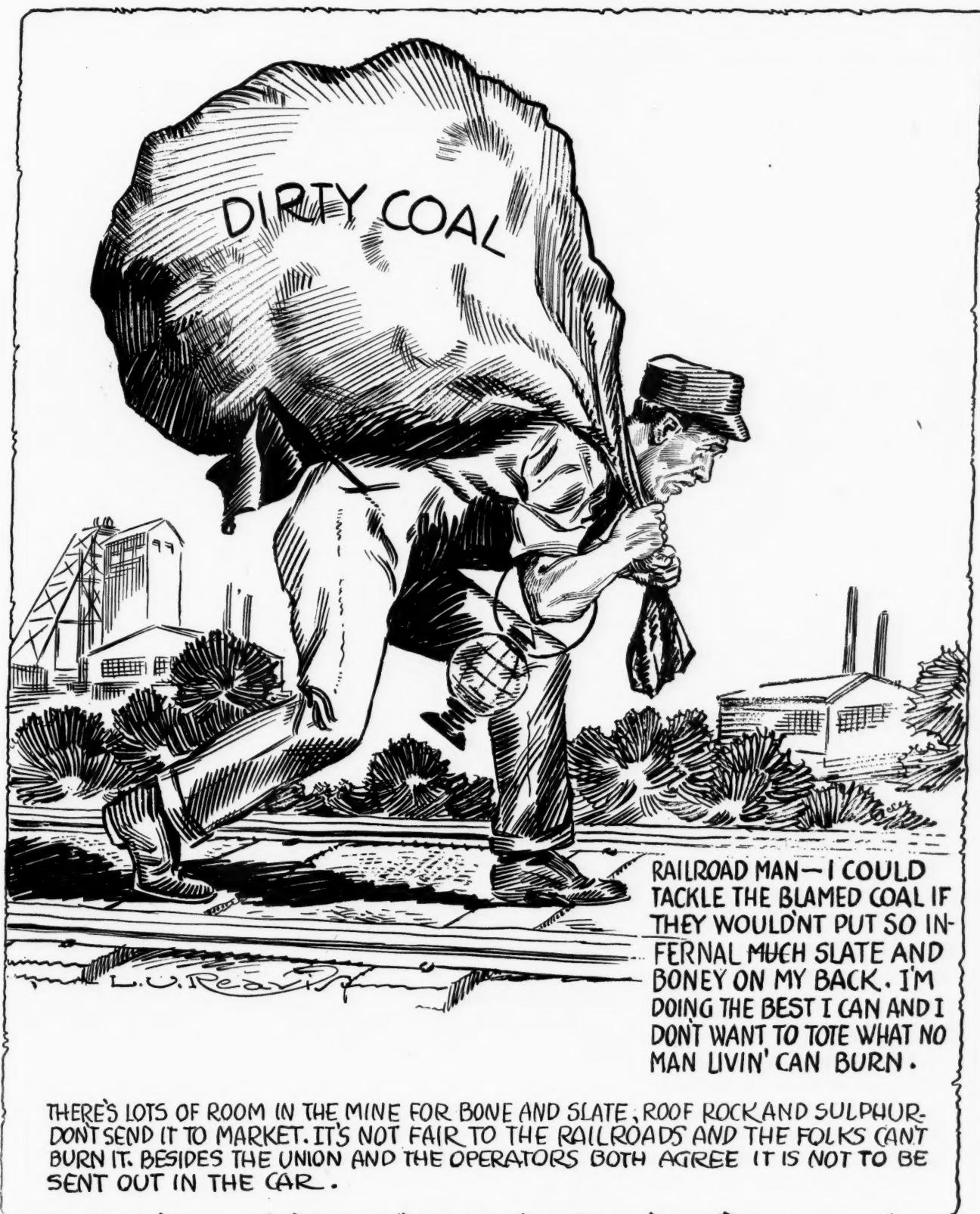
The Fayette County Fuel Administration is back of this new departure. C. E. Lenhart and R. M. Fry of the Uniontown region and J. M. Jamison, of Greensburg, members of the regional fuel committee, met at Washington with W. S. Blauvelt, coke director, and the legal advisors of the fuel administration, and decided that the plan should be adopted.

The operators will use the record, should they after the war is over have occasion to lay off men because business is bad. Those who have not been loyal to the nation during the war will be given their walking papers first.

The men themselves have entered into the spirit of the ruling. Its operation, while yet at too early a stage to permit any conclusions to be drawn, will without a doubt have an effect in stiffening the morale of the coal and coke workers.

Fuel administration officials point out that a majority of the men in the region are intensely loyal but that a slight minority of them have become restive under the abnormal wage scale. The fuel administration is working in close coöperation with the county draft boards, and the labor records kept by the fuel administration will be available to draft authorities for the enforcement of the "work or fight" ruling.

It's Hard Enough Work To Tote This Year's Coal, So Leave the Rock in the Mine



EDITORIALS

Pulverized Fuel

IN THE early days when anthracite was struggling for commercial recognition, nothing short of selected lump was accepted by the domestic consumer. He broke it up by hand for use in his stove. Today the smallest particle of combustible coming from the mine is conserved for immediate use or the probable demands of the future.

With the rapidly increasing demand for fuel and the better knowledge as to available supplies and their limitations for meeting future demands comes greater conservation of resources. Cheapening of costs of manufacture and simplifying labor problems lead to further refinements in processes, greater use of machinery and the more complete utilization of byproducts. From the foregoing, the use of pulverized fuel is a natural outcome. In some cases the application of this form of fuel seems to have passed the experimental stage; in other instances difficulties which developed have not always been overcome.

Possibly the first successful extensive commercial use of pulverized coal as fuel was in the cement industry. Here there was a pressing demand for a low-priced fuel of high efficiency, and powdered coal has proved to be almost an ideal fuel. It has come into almost universal use as a fuel for clinkering cement. It has also found wide application in many chemical and metallurgical furnaces. It has steadily advanced in a great variety of fields where requirements call for a degree of heat that may be readily controlled.

Machinery has been developed which will dry, pulverize and deliver fuel to furnaces at a reasonable cost. The advantages of powdered fuel are well known, including the utilization of practically every heat unit in coal and the use of automatic machinery which only needs supervision, adjustment and repair. With the decreasing and uncertain supply of fuel oil and natural gas, there is increasing interest in the use of byproducts of mining and manufacture. Anthracite culm, bituminous screenings and coke breeze assume a new and further importance.

The subject of pulverized fuel is most alluring, but balancing its notable successes are conspicuous failures. Its superiority and economy over successful stokers are slight if measurable. On railroad locomotives its use seems to have passed the experimental stage, and commercial applications are said to be making headway, especially in the West. This special field offers unusual attractions to the advocates of pulverized fuel, as next to labor the largest single item of cost in transportation is the fuel used in locomotive operation. Locomotives exact a toll of about one-quarter of the coal moved over railroads, which represents an expenditure of some 300 million dollars annually. Of this amount 75 to 100 millions of dollars are required to kindle, clean and maintain fires on grates at times when locomotives are non-pro-

ductive. Railway demands are more exacting every year, and the use of pulverized fuel may be not only a most effective and economical means for increasing net earnings, but may also satisfy the demands of the public for a reduction in smoke, cinders and sparks.

It is a misfortune that this process has not been extended to include the furnaces of most general use, the class consuming more coal possibly than all other industrial furnaces combined. As applied to the generation of steam in externally fired boilers, the process has met difficulties which have not been generally overcome. In one special type of boiler developed to meet the special requirements of the combustion of pulverized fuel a certain measure of success has been attained. But in the main the process has not been successfully applied to existing steam plants, especially the water-tube boiler.

Among the causes of failure, inadequate combustion space seems to be prominent. The actual combustion should take place with the coal particle in suspension and in cramped space destruction of brickwork and boiler parts may result. The handling of molten ash is another serious problem. If existing plants can be readily adapted to pulverized fuel requirements, then the process would likely receive approval. If a plant must be scrapped to introduce the system, its adoption would probably be delayed some time in active power stations.

Coal Recovery Situation in Illinois

RAELY are coal mining and agriculture so closely associated as in scores of counties in Illinois, and rarely is each industry entitled to a leading place, as in this state. Nature has endowed the prairies of this state with a wonderfully rich soil on which record crops of corn and other farm products are raised. And underneath the surface is stored for use during the coming centuries billions of tons of fuel remarkable for its comparative freedom from impurities and for ideal conditions of mining.

To harmonize these two important industries so as to permit the freest development of each is a big and vital problem. The large coal interests have taken the lead in investigation of conditions affecting the situation. They have been accused as the aggressors in numerous suits for alleged damages to surface in which it was claimed that subsidence and other disturbances were due to improper methods of mining. Until recent years the operators have mined coal in many instances without much system, satisfied to leave two or three cars of coal in the mine for every car sent to the surface, provided the cost per ton would meet the fierce competition and resulting low market price for their product.

The conditions under which mining was carried on tended to give small recovery of coal, squeezes and unsatisfactory results generally. However, it was only recently that surveys have been made by operators to show just what percentage of coal was being recov-

ered. As the value of coal lands appreciated, a number of companies employed engineers to ascertain the amount of coal left in the ground. Finally, interest in this matter reached such a stage that concerted action was taken, and investigation was made of conditions of mining and percentage of extraction of coal in numerous Illinois mines under a coöperative agreement between the Engineering Experiment Station of the University of Illinois, the Illinois State Geological Survey and the United States Bureau of Mines. As an example of their findings it was learned that the recovery of coal in twelve average mines was 42 per cent.—it should have been 80 per cent. As a result of this agitation a change of mining was made in a number of instances with better recovery. In a general way, the adoption of the panel system has given the best results in Illinois up to the present time. But even with the improvements already made there is still abundant opportunity for much better recovery.

Let the Operator Get on the Job

THE mine foreman has rarely had a fair opportunity to make a good showing. Between the law (which regards him as a safety engineer and so trots him to every working face to see if it is safe) and the operator (who views him as a sort of mine manager) he never has had a moment of time. Scarcely has he arrived at the mine than a dozen persons assail him.

One man is about to go home; he has no props. Another man has his coat on and his pail in his hand; he cannot work, his place is full of water. Gennaro Baptiste is wildly gesticulating, trying to tell the boss in "pidgin" English that Tom Stuck didn't cut his place last night and that he, Gennaro, is consequently out of work.

Usually there is no night foreman. Only when the boss comes round in the morning does he learn how a quarter or a third of the night force failed to come out or, having come out, failed for one of a dozen reasons to do a night's work.

Where there is gas there are firebosses during the night turn, but they are usually too busy to correct what is amiss and frequently are not trusted to hire or direct others in the work of repair. Everything waits on the boss, and as he has been trained to regard himself as the end-all and be-all of his operation, he would not have it otherwise.

In a well-ordered mine the mine boss is merely the boss of the bosses in a mine. He is not afraid to have capable certificated men under him. He gives each a certain trick or a certain territory and holds him responsible for its steady running. If the operator had handled his foremen right, had told them the story of Carnegie wanting men who knew more than he did to run his various departments, had pointed out that a foreman was not rated by how hard he worked or how cheaply he supervised the mine, but on the general cheapness of the operation and the steady flow of coal to the tipple, there would be a very different condition.

The cost of supervision per ton may increase, the cost of roadmen and tracklayers may rise, the cost of blacksmiths and carpenters may grow larger; but if the haulage, dumping, pumping, cleaning and trimming costs decline by reason of larger output and better supervision,

what matter about these smaller costs? The mine foreman is a worried man, and a worried man never yet made his employer rich.

Get in touch with your foreman. He has been longing to ask you for several changes, but has lost heart because you cut him off so inconsiderately. Look at his problems with your broader business vision. Ask yourself if a business can be run where the night work is performed by men without supervision and when the early morning finds all the loose ends of the night before to be solved in 15 or 30 minutes. Too often it must be so solved or a goodly minority of the miners get disgusted and restless and so march home.

Get on the job and see the foreman in action. If he had as many hands and heads as a Buddha, he could not perform what is expected of him. View the foreman sympathetically, not critically. Let him see that you are there to help. Stay long enough so that the foreman will not try to shelve difficulties until you are gone. You will soon see why the mine runs so badly, for it is equipped with only one mind and one pair of eyes—the mind and eyes of the mine foreman. If the foreman would only let some one else do some of the thinking and a little of the seeing, if the operator would only pay some one to do a little of both, many a roughly moving operation would run smoothly thereafter.

Cheering News from the Coal Mines

THIS is the period of the year usually marked by small demand for coal and low production. The miner goes to the farm to work, or goes a-hunting with his dogs. There are plenty of cars on all sidings and no orders. In 1916 there were mined in the second week of July perhaps one and one-half million tons of bituminous coal per day. In 1917 the pressure of the country's needs brought the production of bituminous coal in the second week of July to its maximum for the year. The output was nearly two million tons a day—33 per cent. more than in 1916.

This year the maximum is also reached in the second week of July. The tonnage is 2,207,000 tons per day—10 per cent. higher than last year. With fewer men the bituminous mines are producing a larger tonnage. Part of this can be credited to better car service, but a large amount may safely be laid to patriotism. Sentiment, much decried sentiment, is the basis of our success. In fact the moral forces of life are even more important than the mental and physical forces.

Let us be careful, however, about feeling overjoyed about our wonderful success in the industrial field. Let us not forget that while the second week of July last year was the date of our maximum output, it was also the date on which our production began to slump. From two million tons a day in the second week of July the production fell almost continuously to less than 1,700,000 a day in the week ending Aug. 17. Then the production rallied, but it hovered around 1,800,000 tons for the rest of the year, with a couple of slumps, when it fell well below that level.

This decline must not occur this year. The Railroad Administration, mine workers and the coal operators must resolutely determine to raise the record or keep it where it stands. The work of the week ending July 13 must not stand as a monument on the line of production.

DISCUSSION BY READERS

Shortage of Mine Labor

Letter No. 4—After reading the two letters on this subject published in *Coal Age*, June 29, pp. 1209 and 1210, I cannot refrain from remarking on one or two points suggested by the writers.

In the first place, I want to say that we should all stand behind the draft law. I am in favor of the draft proceeding in regular course. There is no question as to the need of men at the front, and the means taken by the Government to secure the necessary army of men is fair to all. It does not debar the volunteer, but volunteers are comparatively few and their number is inadequate, although as the old saying goes "One volunteer is worth ten drafted men."

When it became evident that the volunteer plan was too slow for the urgent needs of the country, there was nothing left for the authorities to do but to enact the Selective Draft Law, which was done without further delay. Compare conditions in this respect with those that exist in Germany, where men have no choice but to obey and there are no "questionnaires," but men are quickly summoned from their various tasks and sent to the front. They are told what to do and when to do it, and there is no appeal. We are in this terrible war and few of us realize its meaning. We must oppose strength to strength, meet intrigue with intrigue and, in every way, withstand the advance of the enemy.

REPORTED ATTEMPT TO HAVE MINERS EXEMPTED

With some surprise, I read the reference made by Fred D. Hicks, in his letter, p. 1210, where he states that a committee of mine operators was appointed to go to Washington, for the purpose of obtaining a ruling, if possible, that would exempt coal miners and skilled mine laborers from the draft. While it is possible to argue in favor of both sides of this question, the fact remains that, in justice to all concerned, the coal miner has no greater claim for exemption than the workers in many other industries. Is it to be supposed, for a moment, that the authorities at Washington do not understand the situation, or are ignorant of the fact that mining labor is scarce and the mines have need of their skilled workers? It is my belief that they understand the matter from A to Z.

In the operation of our industries, I am inclined to think that we could well imitate what has been done in England and France, in this respect. In those countries, women have been utilized in many branches of industry to replace the men who have been called to the colors. In my opinion, we should do everything possible and exhaust all other means to run the mines, before attempting to secure exemption for mine workers. Several years ago when labor was scarce at the mines, I remember the plan was adopted of putting one man in charge of eight or ten men and letting him instruct

them how to drill, charge and fire their holes, and set the necessary post timbers in their places. The scheme proved very successful at that time and there is no doubt that it would be an advantage now.

To the unprejudiced mind, it appears quite clear that the draft law cannot be modified to suit particular industries, and it becomes the duty of each branch of industry to adapt itself to the conditions as they exist. Let every worker do his part to win the war.

Perryopolis, Penn.

R. W. LIGHTBURN.

The Mining Situation

Letter No. 5—Numerous instances can be cited showing gross ignorance in regard to coal-mining conditions, not only on the part of the general public, but also, persons in a position to be better informed, if they would use the facilities that are theirs for acquiring correct information. As proof of this statement, permit me to cite a few instances.

Last winter, the Pittsburgh Street Railways Co., in fighting for the privilege of raising its 5-c. fare, carried quarter-page ads in the city papers. In scare-head type, it was announced that the coal miners were making \$10 a day, and the impression conveyed was that the miners were receiving a flat-rate of this amount. Of course, anyone acquainted with the Pittsburgh coal-field would know that this could not be the case. While there are individual instances of men drawing high pay on contract mining, the average earnings of the miner were much less than the amount named.

In one of its late winter numbers, the Saturday Evening Post carried a featured article that particularly emphasized the high wages it was stated miners were receiving. It was even claimed that a miner's wages frequently reached \$15 or \$20 a day. In this article, one coal company was stated to have built a village of new houses, which the miners refused to occupy, unless the company built garages for the automobiles that the miners were supposed to have owned. The article failed to give the name of the company, however.

PRIZES OFFERED TO INCREASE MINERS' DAILY TONNAGE

Last summer, the United States Coal & Coke Co. offered prizes to the men working in their mines who would earn the most money, loading coal, in a two-weeks pay. The results of this contest were published in *Coal Age*, Vol. 12, p. 166. The men were stimulated by the offer to make their best efforts, with the result that the miner who received the highest prize of \$50 averaged over \$20 a day, for loading coal during that period. The other winners showed averages down to \$10 a day. It can be said without fear of misstating the facts, which became known to many of the men and a few of the local mine officials, that two and in some cases even three men sent out coal on the same check-number and divided the returns after payday.

It is true that mine workers are making better money, today, than was possible a few years ago, but that is the case with the workers in almost every industry. Whether miners' wages are exorbitant or not, the attempt to create this impression in the public mind is quite evident. The instances that I have cited throw a helpful sidelight on the mining situation as it exists today; and it is well, in considering the numerous suggestions that are being made with a view to increasing the production of coal, that the miner should be accredited with his rightful dues.

A word in regard to the physical endurance of miners. West Virginia has a law requiring a certain number of hours that each miner must work per day. The situation becomes trying and difficult when, as occurred last winter during the car shortage, many of the mines are run little more than two days a week and occasionally less. Just before the holiday season, the Governor issued a proclamation, which was published and posted at all the mines, urging both operators and miners to co-operate in working the mines Christmas and New Year's Day.

PHYSICAL ENDURANCE OF MINERS QUESTIONED

No one will deny that there is a limit to physical endurance both in men and animals, and the suggestion of a nine-hour shift for the miner is a doubtful one. Much has been said about the miner working only a half-shift at a time, returning home with a full dinner bucket. The Pittsburgh papers have, this spring, contained interviews intended to show that coal miners were taking long layoffs, or working but a few hours a day. This was supposed to be in advocating labor conscription that would compel miners to work full time.

To one not acquainted with the conditions existing in mines, this suggestion would seem to be a proper one. The practical mining man knows, however, that it is frequently impossible to keep the work going so that there will always be places for the machines to cut; and, again, the miner frequently has finished loading all his cars long before quitting time. Such conditions being unavoidable, it would be senseless to ask the miner to remain underground the entire shift when he could be enjoying the sunshine and breathing the fresh air of heaven, which would invigorate him for the work of another day.

CONSCRIPTION OF MINE LABOR

Speaking of conscription, if the Government conscripts labor, it should conscript the mines also. The coal operator should not be permitted to receive the entire benefit from a conscription of labor, compelling the men to work in the mines while the company enjoys the profits. When men are led to doubt the loyalty of coal miners as a class, they should consider the amount of money these workers have donated to Red-Cross work, and subscribed for Liberty Bonds. These amounts will compare favorably with those subscribed by workers in any other industry.

If conscription comes to the coal mines, the Government must play "no favorites," and the mines, with the workers in them, must be conscripted alike. In the draft of men for the war, the Government becomes responsible for their housing, clothing and living. In the conscription of labor for the mines, the Government must

likewise be responsible for the welfare of the workers, and not leave this to the tender mercies of the coal operators.

In closing, let me say that it is my belief that much better results could be obtained in other ways than by conscription of labor, in coal mining. The work of the miner accustoms him to danger and develops an independence that resents compulsion. There is every reason to believe that conscription under private ownership would be regarded by the miner with suspicion.

Connellsville, Penn.

RALPH W. MAYER.

Sealing Off Fire on Intake

*Letter No. 5—I have been much interested in following the discussion, so far, of the question of the order of building the stoppings to seal off a fire on the intake of a pair of headings. This question was asked by "Ancora," *Coal Age*, June 22, p. 1173, who stated that the headings were driven in solid coal and that the fire had gained such headway when discovered that it was thought best to seal it off by building air-tight stoppings.*

It is most important to choose experienced men for this work. There should be two parties so that one party can relieve the other, at intervals, and be always ready to render assistance, if needed. The plan would permit the men to rest, for a brief time, in the fresh air, and avoid the risk of being overcome by the smoke and fumes produced by the fire, while the work would be done more rapidly.

Having gotten the men and material together at a point near the fire, the volume of air passing the place



SEALING OFF THE FIRE BY STOPPINGS

should be reduced by opening small holes in one or more of the stoppings outby. If it is possible to reach the crosscut next to the fire and marked A in the accompanying figure, this should be taken down, which will short-circuit practically all of the air at that point.

A temporary screen or brattice must now be erected to shield the workmen while building the first stopping on the return airway at B, just inside of the open crosscut A. I would build a good substantial stopping of two brick walls laid in mortar, filling the space between the walls with sand or road dirt. When the stopping is completed to the roof, the outside face of the brick wall should be plastered with clay to prevent any leakage or air or gas.

After completing the stopping on the return, a similar one should be built on the intake at C. This also should be a substantial stopping consisting of double brick walls laid in mortar and filled between with sand or road dirt and the face of the stopping plastered with clay. Care should be taken that the men have a plentiful supply of air while performing the work.

The order of building the stoppings here described is what is termed "working from the return to the

intake." The reason for proceeding in this manner is as follows: When the return stopping is built and closed first the smoke and gases generated by the fire will collect behind the stopping, and the space between it and the fire become filled with extinctive gases. Since the fire, in this case, is fed with fresh air, more carbon dioxide (CO_2) and less carbon monoxide (CO) will be formed, and the mixture be more extinctive than would be the case if the intake airway had been closed first.

On the other hand, if the first stopping is built on the intake, not only would the supply of air to the fire be limited, which would mean a larger production of carbon monoxide (CO), but the space beyond the fire would soon be filled with poisonous gases and greatly increase the danger to the men when building the second stopping on the return. There would also be the danger of an explosion occurring, owing to the fire igniting the combustible gases, which would accumulate behind the stopping on the intake, immediately after that stopping is closed. This explosion would not only destroy the stopping but would probably do much damage throughout the mine.

In some cases, it may be advisable to build another pair of stoppings outside the crosscut A, in which case, another crosscut should be opened by removing the stopping just outby from the point selected and the work performed in the same manner as before.

Oakview, W. Va.

WILLIAM DICKINSON.

Letter No. 6—In the case mentioned in the inquiry by "Ancora," *Coal Age*, June 22, p. 1173, the fire has gained such headway that it would seem the first thing to be done is to get the men and animals out of the mine and then slow down the fan, or short-circuit a portion of the air passing in the headings where the fire has occurred. A current of 30,000 cu.ft. per min. is too large a volume to be permitted to reach the fire.

My plan of sealing off this fire is similar to that described by W. H. Noone, *Coal Age*, July 6, p. 33. I



PLACING A STOPPING INBY OF FIRE

would build a line of brattice, as shown in the figure, starting from the outby corner of the open crosscut A, on the return side and extending up the return airway and through the last crosscut B, beyond the fire.

By this means, it would be possible to carry sufficient air forward, not only to prevent the accumulation of any dangerous quantity of gas in the headings beyond the fire, but the plan would enable a second stopping to be placed at a point further in than that described by Mr. Noone and shown in his sketch on p. 33.

Let me suggest that it might even be possible, with the help of the fresh air current conducted by the brattice, to reach a point, on the intake airway, back of the fire. In that case I would attempt to build the second stopping on the intake, just outside of

the last crosscut and inby from the fire. Should it be found possible to do this, the fire would be completely isolated and quickly smothered.

MATTHEW STAFFORD.
Chase River P. O., Vancouver Island, Canada.

Letter No. 7—Although this question has been discussed in *Coal Age* before and many important points brought out, it is my opinion that there is still much to be learned on the subject. The work of building stoppings to seal off a fire that is burning in mine entries is one of the greatest danger both to life and property. For this reason, the men performing the work must take no chances, but must understand the conditions that exist and what is required to insure the greatest degree of safety.

Every mining man who has had experience in dealing with fires underground knows that each case is different and that no two fires can be treated alike. My belief is, however, that when the fire is located in a pair of headings driven in solid coal and has gained such headway that it is necessary to seal off the fire, the first stopping should be built on the intake airway. It is my opinion, moreover, that only one stopping needs to be built in this case; because, when the first stopping is built and the intake airway closed, the air is completely cut off from the fire.

SUGGESTS BUILDING ONE STOPPING ONLY

To my mind, there is no cause whatever for building a second stopping in the return airway, since no air and comparatively little smoke will be passing out by the return when the air current is shut off on the intake. This, of course, assumes that the intake stopping has been properly built and sealed. Moreover, it would be difficult for workmen to perform any work on the return side, owing to gas filling the place.

When building a stopping to seal off a fire, the work must be done by practical, experienced men and be quickly performed. All necessary material should be at hand in order that there may be no delay, which would cause the quantity of air passing over the fire to be decreased little by little. It is my belief that sufficient air should be permitted to pass over the fire while the stopping is being built, to carry off the gas and prevent its accumulating. When the air is finally shut off, this should be done quickly.

The inquiry states that these headings are producing a small amount of gas and a good air current will be required to sweep away this gas and prevent its accumulation while the stopping is in course of erection. Otherwise, small explosions will be liable to occur, in the heading beyond the fire, while the work is being done. Should that happen, it would be a warning to the foreman to withdraw his men from the place.

EXPLOSIONS CAUSED BY SEALING OFF FIRES

Two of the greatest explosions that have taken place in the anthracite region occurred while walling off a mine fire. Small explosions were heard while the stopping was being built and ten or fifteen minutes after it was closed, a heavy explosion blew out the stopping and did much damage in the mine. The reason for this was that, the air current being reduced gradually,

a very explosive mixture accumulated behind the stopping with the result I have mentioned.

My plan is, therefore, in a case such as that mentioned in this inquiry, sufficient air should be kept in circulation to prevent the formation of a firedamp mixture in the heading. The first and only stopping should be built on the intake airway at the nearest point of approach outby from the fire. This stopping should be arranged with a trapdoor that will permit a good air current to pass while the work is being performed, and which can be closed quickly when the work is done. After closing the trapdoor the men should withdraw quickly from the mine.

My opinion is that, when the air is stopped suddenly, by the closing of a trapdoor, such as I have mentioned, the fire burning within will die out for the want of air. I believe this method will insure the greatest safety in the performance of the work. FRED D. HICKS.

Kingston, Penn.

Travel of Electric Current

Letter No. 1—In response to the inquiry by "Student," *Coal Age*, July 6, p. 35, asking if the flow of an electric current in a wire conductor takes place through the wire or on the surface of it, permit me to say that it is now understood that a direct electrical current permeates the entire body of the wire and is not confined to the surface.

This appears to me to be shown clearly by Ohm's law, which makes the current, in amperes, equal to the electromotive force, in volts, divided by the resistance, in ohms. Calling the current in amperes, C ; the electromotive force, in volts, E ; and the resistance, in ohms, R , this law is expressed by the formula

$$C = \frac{E}{R}$$

Now, for the same material in the wire and the same temperature, the resistance, per unit length of conductor, varies inversely as the size of the wire. For example, if one wire is twice as heavy as another wire of the same length, material and temperature, the resistance of the first wire, per unit length, is just one-half that of the second wire. Such being the case it follows that, for a given voltage, the current passing in the first wire will be twice that in the second wire.

To illustrate, let me assume two conductors in the form of a ribbon, say 1 in. wide, and suppose the first ribbon is $\frac{1}{2}$ in. thick while the second ribbon has a thickness of $\frac{1}{4}$ in. It is clear that the surface of these two ribbons, per unit length, is equal; yet, the first ribbon, being twice as thick as the other, will carry twice the current, under the same pressure or voltage, the two ribbons being of the same material and temperature.

Again, a solid conductor will carry the same current as one of equal weight, per lineal foot, but having the form of a hollow tube or cable, notwithstanding the surface of the latter is evidently much greater than that of the former.

It must be remembered that the foregoing applies only to direct current. In conductors carrying alternating current, there is a "skin effect," and the current density has been found to be greater in the outer portion of such conductors. However, with small wires carrying

light currents such as are employed in mines, this effect is not appreciable but, in central-station work, where heavy currents are carried in large cables, the skin effect must be taken into account. For this work, in order to give the cables a greater surface they are often made with a rope or jute center. A. W. SPAHT.

Christopher, Ill.

Blue Gem Coal in Tennessee

Letter No. 1—Referring to the inquiry that appeared in *Coal Age*, July 13, p. 80, asking if the "Morning Glory Mine," of the Oneida Consolidation Coal Co. is working the genuine "Blue Gem" coal seam, permit me to say that it is not.

Having handled coal from this mine some years ago, as well as coal from other mines in that district—the Pumpkin Hollow, Jakes Tank, and the Stanley mines—commonly known as the "Paint Rock" coal, I can state with some assurance that the coal referred to here is not the genuine "Blue Gem" coal, but the "Paint Rock" seam. It is the same as that worked by the old Glen Mary Coal & Coke Co., which was known locally as the "Glen Mary" seam.

The Blue Gem seam lies just a few feet under the Jellico seam; and geologists claim that the Brushy Mountain seam, which is being worked by the Baker Coal & Coke Co., further down the Tennessee Railroad, is the Jellico seam. While I have never been to this operation, I understand it is a lower formation than the seam that the Paint Rock mines are working. This, of course, would make the Paint Rock seam much above the Blue Gem seam.

Even if the coal referred to by this inquirer was the Blue Gem seam, it could not be marketed as Blue Gem coal, because it is altogether of a different character and quality. The Blue Gem coal is the highest grade of domestic coal mined in the South. The coal is very low in ash and a quick-burning hot coal.

The Paint Rock coal is of a good quality, but heavier in ash and a slower burning coal. It will not satisfy those who have known and used the Blue Gem coal. When conditions were normal the Paint Rock coal usually brought from 15c. to 20c. less than Jellico coal, and the latter brought from 15c. to 25c. less than the Blue Gem coal. It is quite evident, therefore, that there was always a difference of from 30c. to 50c. per ton, in the price on the market, between the Paint Rock and the Blue Gem coals.

H. B. BONNEY,

President H. B. Bonney Coal Co.

Chattanooga, Tenn.

Loyalty of Foreign-Born Miners

Letter No. 1—Numerous references have been made, recently, in the columns of *Coal Age*, to the loyalty of foreign-born miners. Attention has even been drawn to the assumed menace to mine safety, in the employment of enemy-alien miners. But some writers, on the other hand, have pointed with pride to the large amounts invested in War Saving Stamps and Liberty Bonds, by foreign-born miners working in our mines.

Observation and experience have impressed me with the idea that the question of increased loyalty of this class of mine employees can never reach the supreme

height until the degree of assimilation is raised to a higher standard than exists at the present time. To my mind, success or failure hinges absolutely on our ability to assimilate this class of mine labor, in a distinctly human fashion. We must learn to appreciate more readily the things that are dear to them, and be quicker to realize the peculiarities and traits of the foreigners that come to our mines.

Ellis Island, where the large majority of immigrants to this country first set foot on American soil, has been aptly described as "one of the saddest spots in the United States." It is here that foreign-born miners first come into direct contact with American civilization. When they arrive they are absolutely devoid of the principles, hopes and ideals on which our American civilization is based. Their education is extremely limited and they come to a land of which they have heard glittering tales of freedom and wealth.

It must be admitted that the majority of Americans do not meet these people with the ready sympathy and the distinctly human attitude that their condition demands, and help them to carve their own destinies as true American citizens. This is particularly true at the coal mines. Few mine officials realize that it is possible to make genuine American citizens of these foreigners seeking work and who are more willing to be taught and quicker to obey their instructions than are American miners. Many of our largest coal corporations are practically wholly dependent on their foreign-born miners for maintaining the daily production of the mines. It is not strange that the great sense of loyalty demanded of all miners by the present situation does not appeal to the foreign-born as to the native miner.

A SUGGESTION WORTH FOLLOWING

Let me suggest that, among the employees of every large coal operation, there should be a set of men who would act as missionaries of patriotic zeal among the foreign workers, in and out of the mines. These men should be possessed of a broad vision, great patience and wisdom and deal generously. In other words, they should have a heart for the foreigner and treat him as a brother—be a true friend to him, one to whom the man would learn to confide his troubles with confidence that he would help him.

In brief, let me say that one of the first steps in the assimilation of the foreigner is to gain his confidence by sympathy and helpful advice. Strive to have him realize that American ideals are of the first importance in the enjoyment of American freedom and privileges. Many foreign-born miners who have returned to their own land, after several years in this country, would not have decided to go home had they been induced to apply for their citizenship papers and been shown what is necessary to accomplish this.

In furtherance of their work along this line, these missionaries whom I have described should have every facility given them by their several companies to assist them in their efforts among the foreign classes. They should be helped to make life worth living for the foreigner, and this should be done without ostentation and with great simplicity and kindness. Every wise management must realize that a man's productiveness, whether he be native or foreign born, is gaged largely by his surroundings, and this applies not alone to the

miner but to his home and family. It goes without saying that where the living conditions and the social atmosphere surrounding the miner and his home are satisfactory, he is loath to leave the place, which becomes to him in every sense a home. Permit me to quote here a few sentences from an article that I read a short time ago, and that, to my mind, suggests the best thought on this question of our relation to the foreign worker:

What have we got to tempt the tired workman after eight or ten hours of arduous labor? In most cases simply nothing; his only relaxation is a roadhouse or saloon. What have we got for the children? In some places a school, good or bad. Have they a playground? A strip of land perhaps, which has been generously donated, thinking that our duty ended there, and forgetting entirely that our own plant would not be producing unless we equipped it with buildings and machinery.

We should furnish this playground with horizontal bars, ladders, slides and swings, where the children, the bold and the timid, may get helpful bodily exercise. We should not forget some generous flower beds and shrubs, so that the eye and artistic sense may be unconsciously directed toward the beautiful things of life. Going further, let us see that these flowers find their way into the home and garden plots, that the men and women may absorb these refining influences.

But it must not end here. We must train the teachers to understand and use this equipment. We should have a physical test for the teacher just as we have for the army officer, in order that he or she may direct the children properly. A teacher's berth should not be a charitable affair; it should be an office of privilege, selection and ability and subject to regular examinations for fitness.

Let me urge that we study more closely the conditions of life and previous training of our foreign-born miners. Down in Kentucky, a short time ago, I watched through my hotel window a crowd, largely composed of foreigners, who were listening to strains produced by a band and which I had difficulty to recognize as those of our national anthem. The cornetist and base drummer were two ambitious and made the rendering of the beautiful "Star Spangled Banner" anything but what would arouse the patriotic zeal of the listener.

How many of us have not observed the mirth-provoking procession of a foreign wedding, in one of our mining camps? Generally the bride and groom lead the procession, which is attended by a cornet and base drum. Is it not true that the joy of the occasion is saddened, for us, by this display, so lacking in the higher ideals of American life?

While I might enlarge further on the necessities of the foreigner's education in American ideals and customs, sufficient has been said. Let us not forget the powerful effect of motion pictures, which should be selected to inspire the foreigner with American ideals and ambitions, rather than to entertain him with blood and thunder acts and scenes.

If mine officials would interest themselves in regard to the character of pictures shown in the mining towns and camps about them, it would go far toward increasing the efficiency of their workmen. At the present time, efforts in this direction should be to increase patriotic zeal and fervor, as much hard work remains to be done before the world is finally saved for civilization.

Philadelphia, Penn.

OBSERVER.

INQUIRIES OF GENERAL INTEREST

Electric Drive for Rope Haulage

We have a pair of steam engines 14 x 18 in., geared to a drum shaft carrying two drums arranged for main-and tail-rope haulage, on a slope. The engine shaft is 5½ in. in diameter and carries a pinion that engages a gearwheel on the drum shaft, the ratio of gearing being 3:1. The diameter of each drum is 5½ ft. and the engines are making 60 r.p.m.

The slope is 2600 ft. long and has an average grade of 5½ per cent., except at one place where the grade is 10 per cent., for a distance of 100 ft. We have been using a 4-in. steel haulage rope. The mine cars weigh 1500 lb. each and carry 3000 lb. of coal, making the weight of the loaded car 4500 lb.

It is proposed to replace the steam engines now in use with an electric drive, and to haul trips of 32 cars, making 5½ trips an hour. What I want to ask is, what power of motor will be required for this work? Also, is the 5½-in. engine shaft strong enough?

———, Ala.

ENGINEER.

The first step in the solution of this problem is to ascertain the maximum load on the rope when hauling a loaded trip that has reached the 10 per cent. grade. For the purpose of this calculation, we will estimate the gravity pull of the entire trip of 32 cars, for the maximum 10 per cent. grade, although a portion of the trip only will occupy that grade at one time, the grade being only 100 ft. long.

The total weight of a loaded trip is 32×4500 equals 144,000 lb., and the gravity pull for a 10 per cent. grade may be taken as $\frac{1}{10}$ of this weight, or 14,400 lb. We will assume a track resistance of, say 15 lb. per ton, which gives $15(144,000 \div 2000) = 1080$ lb. Ignoring, on this light grade, the weight of the rope itself, the load on the rope is the sum of the gravity pull and the track resistance, which is 15,480 lb. or 7.74 tons. Taking six-strand, seven-wire, steel haulage rope, the diameter of the rope required for this load is

$$d = \sqrt{\frac{fL}{37}} = \sqrt{\frac{5 \times 7.74}{37}} = \text{say } 1 \text{ in.}$$

Since the engine shaft has a speed of 60 r.p.m. and the ratio of gearing is 3:1 the drums are making $60 \div 3 = 20$ r.p.m. Adding the diameter of the rope to the diameter of the drum gives for the effective diameter of winding 5 ft. 7 in., or 5.58 ft. The circumference corresponding to this diameter is $3.1416 \times 5.58 = 17.53$ ft. If the drum is making 20 r.p.m., the speed of winding or rope speed is $20 \times 17.53 = \text{say } 350$ ft. per minute.

The power required to haul a loaded trip, at this speed, on a 10 per cent. grade, assuming an efficiency of the motor of 90 per cent will then be

$$H = \frac{15,480 \times 350}{0.90 \times 33,000} = 182+ \text{hp.}$$

In electric haulage this power would be expressed as $182 \times 0.746 = 136$ kw. For this power, the diameter

of the engine shaft, run at the speed of 60 r.p.m. may be estimated as

$$D = \sqrt[3]{\frac{100H}{n}} = \sqrt[3]{\frac{100 \times 182}{60}} = 6.7, \text{ say } 7 \text{ in.}$$

We would therefore suggest the installation of a motor capable of producing say 150 kw. The 5½-in. engine shaft should be replaced by a shaft 7 in. in diameter, and a 1-in. steel haulage rope should be used for this haulage.

Ventilating a Gassy Slope Mine

We are about to open a slope mine in a seam having a general dip of 6 per cent. and generating large quantities of explosive gas. Before deciding on the general plan of working, I want to ask for information in regard to the best method of ventilating such a mine.

Tower Hill, Va.

MINE FOREMAN.

A slope mine opened in a gassy seam should have not less than three main slopes driven on the full dip of the seam. The center opening should be made the main haulage road and intake for the entire mine, while the two side openings serve as return airways for their respective sides of the mine. These openings should all be 6 x 10 ft. in section.

The mine should be ventilated on the exhaust system; and, for this purpose, a centrifugal fan should be installed at the mouth of one of the return airways, which should be connected underground by crosscuts in the slope pillars and an overcast on the main haulage road. The fan should have a capacity capable of supplying the volume of air required for the entire mine, under a water gage varying from 1 to 2 in. In order to provide against the possible failure or breakdown of the fan, a duplicate fan should be installed, either at the same opening or at the mouth of the other return airway. Only one of these fans should be operated at the same time, the other being held in reserve ready for immediate use in case of emergency. In a gaseous mine, it is always safer to provide duplicate means of ventilation, to provide for any possible emergency.

The general plan of working the seam described by this correspondent will involve the driving of pairs of cross-entries to the right and left of the main slope. The first pair of these cross-entries must be driven about 150 yd. below the mouth of the main entry, provided the roof of the seam will permit rooms to be driven 75 or 100 yd. in depth. The first right and first left entries should be haulage roads and intakes, while the second right and second left entries are made return aircourses for their respective sections of the mine. Rooms should be driven to the rise of the cross-entries. The return air is conducted by means of an overcast or air bridge over the return airway. We have only treated this inquiry in a general way and shall be glad to have our readers' comments and suggestions.

EXAMINATION QUESTIONS

Mine Foremen's Examination, Hazleton, Penn., Apr. 23, 1918

(Selected Questions)

Ques.—How may a squeeze or creep be stopped and the damage it is calculated to do be localized?

Ans.—The only practical method that will prove effective in stopping or localizing a squeeze that has already begun in a mine is the plan, now quite generally adopted, of quickly drawing adjacent pillars and all timber left standing in adjoining abandoned places. If this does not cause an immediate roof fall, some means should be adopted to produce that effect at the earliest opportunity. It may be necessary to place one or more shots in the roof to start the fall.

Solid timber cribs can sometimes be utilized at points where the pillars are weak, in order to prevent the spread of the damage in that direction. However, the plan of setting timbers to prevent the progress of a squeeze in mine workings will generally be found to do more harm than good. What is required is to produce a heavy fall of roof so as to relieve the pressure on the pillars.

Ques.—What arrangements would you make to prevent cars from running over the top of slopes or shafts?

Ans.—Safety blocks and derailing switches should always be installed at the head of a shaft or slope. These should be automatic so that they will always be set to prevent cars from reaching the shaft or slope, except as they are thrown by a lever arranged for that purpose. In addition to these devices, the top of a shaft should always be protected by safety gates to prevent persons from falling down the shaft.

Ques.—Give the reasons for putting a cap-piece on a prop and state what should be the size of the cap and the kind of wood to give the best results.

Ans.—A good cap-piece not only gives a better bearing for the top of the post against the roof and distributes the pressure, but it also affords a means of showing any increase of roof pressure, which is indicated plainly by the crushing of the cap. This also has the effect of binding the top of the post together, thus preserving and strengthening the post. A cap-piece also expedites the setting of a post.

Cap-pieces should be slightly broader than the top of the post. They should never be less than 6 or 8 in. in width and from 18 to 24 in. in length, depending on the character of the roof and the pressure. Cap-pieces should not be less than 2 in. in thickness and made of soft wood, so that they will yield more readily under the pressure and prevent the furring of the top of the post.

Ques.—What regulations would you adopt for the use of safety lamps, in a mine where gas is given off freely?

Ans.—A thoroughly equipped lamphouse should be provided on the surface, a short distance from the mine entrance. The lamphouse should be in charge of a competent man who would be responsible for the delivery

of all lamps to the workmen, in good and safe condition, in return for a check indicating the number of the lamp used by the man. The lamps should be kept in a suitable lamprack, having hooks or pigeon holes numbered to correspond to the numbers on the lamps. All lamps received from the workmen at the close of the shift are first cleaned, filled and trimmed. Each lamp is then carefully examined and returned to its proper place in the rack, ready to be lit and delivered to the man, in the morning, on presentation of his check.

All lamps should be owned by the company and be of an approved type. Every lamp must be provided with a lock or fastening that will reveal any attempt on the part of a man to tamper with his lamp. Each man should be held responsible for the condition of the lamp he has used. No man should be permitted to use a safety lamp or to hold a check for a lamp until he has proved that he is capable of handling and using a safety lamp.

The fireboss should examine each man to determine whether or not he is capable of using a safety lamp. The men should be given all needed instructions to insure the safe use of lamps in the mine. If a lamp is extinguished by accident, while the man is at work, it must be taken to a relighting station, and no attempt should be made by the man to light the lamp himself. Any violation of the rules regarding safety lamps and their use should be punished by a suitable penalty.

Ques.—What kind of haulage would you recommend to replace animal haulage where the mine has been extensively developed, and why?

Ans.—Some form of mechanical haulage should be adopted on the main roads, as early in the development of a mine as practicable. This should consist of some kind of rope or locomotive haulage, depending on conditions in the mind. Where there are no grades that would prevent the use of locomotives, this type of haulage will generally prove more elastic and serviceable than rope haulage. The latter, however, will be required where the grades on the main roads would interfere with the efficiency of locomotive haulage, by reducing the number of cars that could be hauled in a trip and otherwise delaying the movement of the coal to the foot of the shaft or slope.

The use of storage-battery locomotives is rapidly increasing on gathering hauls, in large mines, and is giving good satisfaction. Their use in the workings to replace mules possesses the advantage of eliminating the refuse deposited by the mules, and thus clarifying the air. Also, a motor absorbs no oxygen and produces no carbon dioxide as does the breathing of the animals used on gathering hauls. Compressed-air-locomotive haulage, while furnishing fresh air in the workings, requires the installation of a good compressing plant and pipe lines for the transmission of the air to the working face. It is of advantage to operate the drills and coal cutters at the face with the same power as employed for haulage, which conditions alone can determine.

COAL AND COKE NEWS

Harrisburg, Penn.

Approval has been given by the Governor, the Attorney General and the Commissioner of Health of plans submitted to the State Department of Health for the establishment of model towns in two counties in southwestern Pennsylvania, the corporations which are providing housing for their employees recognizing that it is best to get started right and to seek the advice of the state's experts. The companies which submitted plans during the week were the Ellsworth Collieries Co., which is building extensions to mining towns in Washington County, and which presented plans for modern water and sewerage systems, and the Pennsylvania Rubber Co., which is starting a large addition to the borough of Jeannette, Westmoreland County, to house its workmen.

Every month the state authorities are being called upon to help in the planning of towns by corporations which want their people housed right and given healthful environment with adequate water supplies, instead of going through the old haphazard system of building houses to meet demands and then regretting the mistakes made through not obtaining the right kind of advice and the approval of state authorities.

On account of uncertain credit conditions, now that the Government supervision of coal distribution is well underway, shippers of bituminous coal are seriously considering pressing for such reforms as will guarantee payment on all shipments. War industries are said to be notably lax in paying their coal bills, regardless of the fact that the operators must pay the miners on time or have a strike on their hands.

Another uncertain condition is with the railroads, as the operators are compelled to supply the railroads with 100 per cent. of their requirements, and practically all declare they cannot get their money. The railroads argue they haven't the money, in view of the fact that the Government has not yet started rental payments. To some of the shippers the railroads have not paid a cent for two or three months, and these operators are put to extremes to get credit extensions to permit them to conduct their business.

Uniontown, Penn.

Opposing financial interests have taken their battle for control of the Thompson Connellsburg Coke Co. into the Fayette County Court. J. H. Hillman, Jr., of Pittsburgh, who recently acquired more than 8000 of the company's 30,000 shares of capital stock, is seeking to oust the present officers. J. P. Brennen, president; A. G. Livengood, vice president; and W. G. Rock, secretary and treasurer. Testimony was taken this week before Judge J. Q. Van Swearingen in a preliminary injunction order restraining the annual meeting of stockholders scheduled for May 6, last, until the rights of the litigants are determined. The evidence showed that a few days before the scheduled meeting Mr. Hillman acquired a block of 5750 shares placed as collateral by J. V. Thompson with the First National Bank of Pittsburgh. When he sought to have the stock transferred upon the company's books, witnesses testified, the officers declined to meet the request on the ground that the books had been closed until after the election. The litigation resulted. No decision has been handed down.

The Connellsburg region had a normal week in coke production, as a normal week is now figured, with the impetus given the operation of the plants by Government supervision. The region's output of coke was 348,296 tons, according to statistics prepared by the Fayette fuel administration, or a decrease of 2000 tons in last week's output. Despite the local coal car shortage there was a record production of 168,507 tons of coal, an increase of 9852 tons over the preceding week. While not plentiful by any means, the railroads by a little juggling are providing operators with 100 per cent. coke cars, and every effort is being made to load and ship cars at the earliest possible moment after placing, to further conserve the car supply.

Altoona, Penn.

A meeting held by the Central Pennsylvania Coal Producers' Association at Altoona, Penn., on Tuesday, July 16, was the most successful meeting of coal operators ever held in central Pennsylvania. Over 350 men, representing 90 per cent. of the tonnage in central Pennsylvania, were present. The meeting was addressed by James B. Neale, Director of Production, United States Fuel Administration; A. W. Calloway, Manager of Distribution, United States Fuel Administration; G. N. Snider, Traffic Adviser, United States Fuel Administration; J. D. A. Morrow, Director of Distribution, United States Fuel Administration; Rembrandt Peale, Bituminous Adviser, United States Fuel Administration; Charles O'Neill, Secretary of the Central Pennsylvania Coal Producers' Association.

The meeting was presided over by Harry Boulton, of Clearfield, president of the Central Pennsylvania Coal Producers' Association. All of the addresses called attention to the shortage of coal and the necessity for greater production. Mr. Neale explained the campaign about to be launched by the United States Government to increase production. This campaign will include many of the features of the campaign launched by the Central Pennsylvania Coal Producers' Association several weeks ago, some of the outstanding features being pledge cards and badges to the miners for efficient service.

Attention was called to the fact that deferred classification of miners until next spring had been asked for and enforcement of national prohibition during the period of the war.

Charleston, W. Va.

The labor supply in several districts of the state is unable to keep pace now with the car supply, both because there is to some extent a less number of miners than are needed and because some miners are indifferent as to whether they work or not. Cars supplied in nearly all the districts of the state are ample for all the coal that is being mined. In short, the supply in many regions is 100 per cent.

The production of 50,000 tons of coal was lost, it is estimated last Wednesday, when all miners in the New River district supplied with power by the Virginian Power Co. were without power and consequently were forced to suspend operations. The trouble is believed to be due to defective construction of transmission lines, since whenever there is a rainstorm the power supply is curtailed. Coming just at a time when New River operators were endeavoring to push up production to top notch, the enforced shut-down was disheartening and demoralizing. Such a contingency was especially disappointing when there was a 100 per cent. supply of cars on hand. The power shortage also affected production in the Kanawha and Winding Gulf regions.

Fairmont, W. Va.

Like other districts, the Fairmont district has apparently not fully recovered from the celebration of the Fourth among the miners, since reports show that there were 528 men idle in the district; for instance, last Tuesday, although there were only 1243 cars in the region on that day, such mines as were shut down were not idle due to an inadequate car supply but because there were no miners to man such mines. The first day's supply for the region—1675 cars—was slightly in excess of normal requirements. Mines in this region, it was announced at a meeting of Kanawha district operators, will within the next few months be expected to furnish 100,000 tons of coal a month to the Government powder plant at Nitro. The mines along the Kanawha & Michigan R. R., which passes through Nitro, have been designated to supply the coal next month and will be required to furnish 25,000 tons, increasing that tonnage within the next few months until 100,000 tons are reached.

Despite many unfavorable conditions the production for the week ending July 13 in the Kanawha district reached the high point of the year, being 205,436 tons, or an

increase of 60,000 tons over the previous week. The increase may be attributed to the number of hours worked—6389 in all. The car shortage caused the loss of only 148 hours, labor shortage being responsible for 537 hours. Many mines in the Kanawha district were shut down last Wednesday because of power failure. Up until July 16, 21,885 loads of coal had been shipped from the district, 20,788 empties being received.

PENNSYLVANIA

Anthracite

Hazleton—Hard-coal companies in the Lehigh region have collected the names of all mine workers who left on July 23 with the various draft quotas for Camp Lee, so that substitutes can be trained to take their positions. Keeping up tonnage is the chief aim of the coal operators, who report that their labor resources are dwindling all the time. The G. B. Markle Co. runs its mines with 51 per cent. of the staff it had in 1913, and the Lehigh Valley Coal Co. is reduced to 75 per cent. of its pre-war strength.

Millersburg—To prevent further removal of river coal from a bed in Wiconisco Creek, the Juniata Public Service Co., furnishing electric current in the upper end of Dauphin, and in Perry and Juniata Counties, has petitioned the courts for a preliminary injunction against D. W. Romberger, et al., directing them to discontinue dredging and removing coal. The company contends it purchased a tract of 19 acres along the creek in order to work the coal bed and that the line of the property extends along the opposite side of the creek. The Romberger firm has been removing about 25 tons of river coal daily.

Tresckow—A fanhouse of the Lehigh and Wilkes-Barre Coal Co. at its No. 21 colliery was destroyed by fire on July 16. The blaze was started by sparks from a passing mine locomotive.

Tamaqua—A contribution of \$25,000 has been made by the Lehigh Coal & Navigation Co. to the war chests which are being established at Tamaqua and Panther Creek Valley towns in the vicinity.

Oakdale—Effective July 16, the G. B. Markle Coal Co. has placed in operation its new breaker in the anthracite coal fields near Oakdale. The plant, entirely constructed of steel, will be used for the preparation of fuel taken from the culm banks, and will provide a daily capacity of about 800 tons. The company has arranged for the temporary employment of about 200 men thrown out of work by the destruction by fire of the Harleigh-Brookwood coal breaker near Hazleton, July 13. The Harleigh-Brookwood company is planning for the immediate reconstruction of its plant.

Pittston—Considerable rivalry exists at the different collieries of the Pennsylvania and the Hillside Coal and Iron companies, between the several superintendents regarding the monthly tonnage of coal at each colliery. The Butler is one of the leading collieries and since assuming control James C. Johnson, the superintendent, has had remarkable success in increasing the daily output. For the month of June, 1918, prepared tonnage was shipped amounting to some 74,000 tons, a gain of over 12,000 tons for same month in 1917.

Bituminous

New Castle—Coal is now being mined in Lawrence County by the stripping process. A mine of considerable proportions has been opened by this method six miles north of this city.

Pittsburgh—The Ellsworth Collieries Co. has submitted plans to the State Board of Health for permission to establish a new town in its bituminous fields in Washington County. The company proposes to build a model settlement with dwellings for its employees.

Steelton—A battery of 80 coke ovens was charged July 8 at the Bethlehem Steel Co., Steelton, Penn. The new battery of ovens will be able to produce about 18 cars of coke daily, which will bring the daily output up to 45 cars of fuel. The H. Koppers Co., of Pittsburgh, erected the ovens. The work of construction covered

a period of 18 months. Due to the scarcity of materials, the work was held up at intervals; thus the job dragged over the stated time of 12 months.

Somerset—One man was killed and a dozen others were injured when the powder magazine of the Black Brothers' Coal Co., at Blackfield, three miles east of Rockwood, exploded on July 17. It is believed that a foreigner employed as a night watchman carried a lighted torch into the magazine. Windows in miners' homes nearby were broken and the occupants cut by flying glass.

Milesville—The United Coal Corporation is building a new railroad tipple at its Ella mine, near here, on the Pittsburgh & Lake Erie R. R., with a belt conveyor for river loading on the Monongahela River, to replace the old rail and river tipple. Pihl & Miller, contractors, of Pittsburgh, are doing the work.

WEST VIRGINIA

Beeckley—By Aug. 1, The Board Smokeless Coal Co. expects to have its plant at Pemberton in operation, a new tipple being now under construction.

Mabscott—Much new equipment has been added to the plant of the Bower Coal Co. at this place, including new mining machines, three locomotives and 250 mine cars. A new two-track tipple is under construction.

Morgantown—From additional information obtained, it appears that the State Hill Coal Co., recently formed, has arranged to take over and operate a developed team track proposition, located at the edge of Morgantown, and will produce about 200 tons per day. The plant to be taken over is now operated by the Pollock Coal Company.

Williamson—The mining and shipment of coal will be begun by the New Howard Coal Co. before the end of the month, the new plant of the company, of which F. L. Schoen is general manager, having been virtually completed.

Hawk's Nest—Lumber has been used by the Gaymont Coal Co. to be used in the construction of a new tipple at the company's plant at this place, and work will be begun on the tipple at once. The company at present is shipping 300 tons of coal a week.

Glen Jean—The Collins Colliery Co., of Glen Jean, is preparing to have in the near future 100 ovens in blast for the production of foundry coke. The old coke ovens have been repaired and a new crusher and storage bins have been completed. It has been five years since any coke was manufactured at this point.

Thurmond—After being out of commission for some time, the mines at Beurytown, on Sewell Valley, renewed operations last week, repairs to the monitors, recently damaged, having been completed.

Logan—With the completion of two miles of railroad on Beard Mill Fork of Dingess Run Creek, the Jones Coal Land Co. is shipping coal from its Isabel Mine No. 1. The company expects to be able to begin loading coal from its No. 2 mine in a short time.

OHIO

Shawnee—A loss of \$10,000 was caused and 200 men thrown out of employment by the burning of No. 3 coal chute, of the Hocking Block Coal Co. Rebuilding was started at once.

Nelsonville—The Packard Coal Co., recently incorporated with Columbus capital, has purchased from Lampman & Juniper a tract of 160 acres located near Nelsonville on the Hocking Valley Ry. It contains a good seam of No. 6 coal. The operating plant will be enlarged in order to double the output. Officers of the company are M. L. Yuster, president and treasurer; Richard Patton, vice president, and C. F. Bookman, secretary.

New Straitsville—A deal has been closed whereby Harry Spencer has secured title to a tract of 80 acres of No. 6 coal on Lost Run, in the heart of the Hocking Valley field. The tract contains a 12-ft. vein and is one of the most valuable of the smaller tracts in this vicinity. The property was purchased from the Hazelton heirs and was closed by E. E. Hazelton, of the Dean Coal Mining Co. Mr. Spencer also controls the Gem Coal Co., which adjoins.

ILLINOIS

East St. Louis—East St. Louis coal dealers have adopted a "no-credit" rule. The East St. Louis Coal Dealers' Association, at its last meeting, passed a resolution that members hereafter will not book orders unless they are accompanied by cash. More than that, consumers who still

owe for last winter's coal will not be able to get any for next winter, even for cash, until they pay what they owe. J. H. Thomas, president of the association, says that delinquents will not be able to buy a single load of coal until old scores are settled.

Bethalto—Threshing is being hindered in this section by the difficulty of getting coal for the engines. Formerly the thresher demand was met by small mines scattered through the wheat belt, which stored enough coal during the spring to meet the heavy demands of the threshing season. But this spring these mines have sold all the coal that they could turn out as fast as they could turn it out, and no storing has been done. Farmers wait all night at the mines to get coal the next morning, and in many instances they have had to haul coal long distances to keep the thresher going.

KENTUCKY

Harveyton—The Hazard Jellico Coal Co. has just installed a new coal-cutting machine in its mine at this place, the machine being of a new type and the first installed in Perry County.

Hazard—The Hazard Coal Co. and the Powell-Hackney Grocery Co. are preparing to erect a large commissary store at Hazard, and will arrange for both concerns to have their offices in this building.

Madisonville—The Louisville & Nashville Railroad Co. has refused to furnish cars to four small wagon mines in Hopkins County, these being the Dixie Bee, Medlock, Hawkins and Ferguson mines, near Morton's Gap. The railroad company alleges that the mines load only about one car a day, and sometimes let cars stand for several days at a time, with the result that it can't furnish them equipment while other large mines are without cars, which can use them immediately. The mine owners have taken the matter up with D. W. Gatlin, County Fuel Administrator.

TENNESSEE

Clairfield—The Standard Jellico Mining Co., which recently filed notice of an increase in its capital to \$50,000, is planning for immediate work on the development of 800 acres of coal properties in the Clairfield district. It is estimated that the works will have a daily capacity of 150 tons.

Foreign News

Nanaimo, B. C.—The Canadian Western Fuel Co.'s new mine, situated near here, and two shafts of which are being sunk to tap the famous Wellington seam, will be known as the Wakesiah mine. To reach the seam the shafts must be sunk 350 ft. The concrete collars are in and sinking has progressed to a depth of about 50 ft. in the hoisting shaft. Plans have been prepared for the various buildings and machinery and mine yards. The mine will be up to date in every respect and will be shipping coal before the end of the year. The company has three other producing mines yielding a monthly tonnage of approximately 65,000 tons and mining from three seams, —the Douglas, Newcastle and Wellington.

Personals

Ray Heller has been made manager of the Columbus, Ohio, office of the Lake Erie Coal Co., which has recently been opened in the Columbus Savings and Trust Building.

E. E. Hazelton, assistant manager of the West Virginia Rail and River Coal Co., of Columbus, Ohio, and the Dean Coal Mining Co., of Columbus, Ohio, began life as a soldier in training at Camp Sherman, Chillicothe, Ohio, July 23.

Oliver W. Ramsay, city fuel administrator, Perth Amboy, N. J., has been appointed a member of the Conservation Bureau of the Federal Fuel Administration. The Bureau has been organized by Richard C. Jenkinson, federal fuel administrator for the state, to encourage conservation of fuel.

B. F. Phillips, of St. Davids, Philadelphia, assistant to the purchasing agent of the Pennsylvania R.R. in charge of the purchase of fuel and building materials, has been appointed fuel distributor of the central advisory purchasing committee, with offices in Washington, having been detailed to handle matters pertaining to coal distribution and contracts for the railroad administration.

Arthur H. Young, director of the American Museum of Safety since Jan. 1, 1917, has resigned to take charge of the Employee Relations Department of the International Harvester Co. He will take up his new duties immediately. Although giving up the actual direction of the museum's work, Mr. Young will continue to be closely concerned with its affairs, for he has been elected to the vice presidency, succeeding the late Dr. Frederic R. Hutton.

Obituary

Thomas F. Righter, of Mt. Carmel, Penn., one of the largest independent coal operators in the anthracite region, died at his home on July 15. He was 70 years of age. Mr. Righter was interested in a number of coal companies in the Schuylkill region.

Latelle Graney died July 13 at 7 p. m. in the Sheltering Arms Hospital at Hansford, W. Va., after an operation for appendicitis. He was prominently connected with the coal-mining industry as general manager of the Long Branch Coal Co. and the East Gulf Coal Co., besides having interests in various other mines. Interment was made July 15 in the Mount Hope cemetery.

Coming Meetings

National Commissary Managers' Association will hold its ninth annual convention Aug. 6, 7 and 8 at Birmingham, Ala., with headquarters at Hotel Tutwiler. Secretary, D. J. Elchoff, 801 Manhattan Building, Chicago, Ill.

American Institute of Mining Engineers, Colorado meeting, Sept. 2 to 7. Plans include a day at Denver, one at Cripple Creek, one day at Pueblo and one day at Leadville. Secretary, Bredley Stoughton, 29 West 39th St., New York City.

Recent Coal and Coke Patents

Coke Oven. F. Peiter, Cleveland, Ohio, 1,267,332. May 21, 1918. Filed Sept. 11, 1916. Serial No. 119,352.

Stoker Bridge. P. L. Crowe, New York, N. Y., 1,261,878. May 7, 1918. Filed July 28, 1914. Serial No. 853,625.

Mine Car Stop. W. Hartman, Mascoutah, Ill., 1,260,901. May 7, 1918. Filed Mar. 8, 1918. Serial No. 221,158.

Chimney Flue Cover. C. A. Larson, Lemont, Ill., 1,266,497. May 14, 1918. Filed Mar. 21, 1916. Serial No. 85,632.

Briquet Molding Machine. C. E. Taylor, Hillsboro, Ill., 1,265,138. May 7, 1918. Filed Mar. 11, 1916. Serial No. 83,569.

Regenerator Coke Oven. E. Leocoq, Brussels, Belgium, 1,265,684. May 7, 1918. Filed May 6, 1914. Serial No. 765,972.

Briquet Machine. E. Fernholz, Los Angeles, Cal., 1,265,441. May 7, 1918. Filed Apr. 18, 1912. Serial No. 691,757.

Mining and Loading Machine. F. Billings, Cleveland, Ohio, 1,265,730. May 14, 1918. Filed Sept. 3, 1912. Serial No. 718,191.

Firing Chamber for Powdered Fuel. W. D. Wood, assignor to Fuel Savings Co., Allentown, Penn., 1,266,088. May 14, 1918. Filed Mar. 23, 1914. Serial No. 826,642.

Furnace Charging Apparatus. S. H. Bunnell and C. G. Peterson, assignors to Griscom-Russell Co., New York, N. Y., 1,265,736. May 14, 1918. Filed Jan. 26, 1916. Serial No. 74,424.

Publications Received

Annual Report of Coal Mines, State of Alabama, 1917. By C. H. Nesbitt, Chief Mine Inspector, Birmingham. Illustrated, 84 pp., 6 x 9 inches.

Maximum Base Prices, Differentials and Extras on Iron, Steel and Nonferrous Products. Penton Publishing Co., Cleveland, Ohio. Pp. 75 + index. Price, \$1. A revised and amplified booklet giving the complete schedules of maximum prices on iron, steel and nonferrous products as fixed by the Government, which are now in effect. This booklet is practically the only up-to-date price manual on iron and steel now in circulation, as the numerous changes have rendered obsolete those previously issued.

Trade Catalogs

W-S-M Coke Oven Machinery. Wellman-Seaver-Morgan Co., Cleveland, Ohio. Bulletin No. 10, Pp. 8; 8½ x 11 in.; illustrated. Describes combination machines for extracting, leveling and coke pushing.

Type IL Series Transformers for Street Lighting Service. General Electric Co., Schenectady, N. Y. Pp. 9; 4 x 7 in.; illustrated. Data covering the characteristics, construction, dimensions, etc., of different types of series transformers.

Rego Welding and Cutting Apparatus. Bastain-Blessing Co., Chicago, Ill. Pp. 29; 8 x 10½ in.; illustrated. Catalog covers the Rego line of welding and cutting apparatus, lead burning equipment, regulators, etc. One noticeable feature is emphasized, and that is the flashback, the most annoying and costly habit of oxyacetylene torches, has been eliminated.

Gibbs Self-Contained Oxygen Rescue Apparatus. Mine Safety Appliances Co., Pittsburgh, Penn. Two-color folder. Describes and illustrates the "only oxygen rescue apparatus developed by Americans and manufactured in America." It is claimed that the objectionable and unsafe features found in other types of oxygen apparatus have been eliminated in the new Gibbs.

C-H Equipment for Mines. Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Pp. 4; 8½ x 11 in.; illustrated. The equipment shown and described in this 4-page pamphlet consists of sectional charging equipment for miners' lamp batteries. Space is also devoted to illustrating and describing charging equipment and control apparatus for mine locomotives. A mine installation of automatic motor-driven pump control is also shown.

New Incorporations

St. Paul, Va.—The Edge Coal Co. Capital, \$10,000. To build and operate a coal-mining plant. J. H. Lynch is the principal incorporator.

Willard, Ky.—The Black Raven Coal Co. Capital, \$100,000. To operate coal properties. Incorporators: H. W. Norris and J. B. Walker.

Pittsburgh, Penn.—The Stanton Coal Co. Capital, \$100,000. To operate coal properties near Bolivar. William S. Byers is the principal incorporator.

Clearfield, Penn.—The Morgan Run Mining Co. Capital, \$50,000. To operate coal-mining properties in Morgan Run district. A. D. Bigler, Clearfield, principal incorporator.

Sassafras, Ky.—Montgomery Creek Coal Co. Capital, \$100,000. To develop coal properties near Montgomery Creek. Incorporators: G. W. Smith, S. B. Snyder and J. W. Reedy, Lexington, Ky.

Nelsonville, Ohio.—The J. W. Fenton Coal Co. has been incorporated with a capital of \$100,000 to mine and sell coal. The incorporators are J. W. Fenton, Robert J. Smith, F. H. Hertel, M. B. Gilbert and E. F. Horston.

Columbus, Ohio.—The Packard Coal Mining Co. has been incorporated with a capital of \$50,000 to mine and sell coal. The incorporators are M. L. Yuster, Richard Patton, E. E. Fox, W. J. Etchen and C. F. Bookman.

Canton, Ohio.—The Chestnut Ridge Coal Mining Co. has been incorporated with a capital of \$5000 to mine and sell coal. The incorporators are H. J. Schory, Elmer Schellhase, Charles Jordan, Russell J. Burt and J. Schully.

Butler, Penn.—The Clover Coal and Coke Co. incorporated in Delaware. \$300,000 capital. To operate coal properties in the vicinity of Butler. Incorporators: D. Ferguson, H. C. Scherf, Pittsburgh, and J. A. McCaffery, Butler, Penn.

Steubenville, Ohio.—The S. M. Hudson Coal and Coke Co. has been incorporated with a capital of \$200,000 to mine and sell coal and coke. The incorporators are S. M. Hudson, Mary R. Hudson, Jane L. Branwyn, William J. Bertram and L. A. Whitaker.

New Straitsville, Ohio.—The Southern Perry Coal Co. has been incorporated with a capital of \$12,000 to mine and sell coal. The incorporators are John W. White, Charles C. White, David M. Watkins, Frank F. Thomas, Jr., Sam Spencer and Thomas Watkins.

Indianapolis, Ind.—The Owen Block Coal Co., a Delaware corporation, has qualified to do business in this state. The amount of \$100,000 of its capital stock is represented

in Indiana. The business of the company is to mine and ship coal. R. W. McBride, of Indianapolis, is named as agent.

Morgantown, W. Va.—There is to be further development of the coal fields of Monongahela district by the State Hill Coal Co. of Morgantown, which has been incorporated with a capital of \$50,000. Those chiefly interested in the company are James R. Moreland, J. H. Wright, J. J. Yoke, L. C. Snyder and Robert E. Guy, all of Morgantown.

Birmingham, Ala.—The Liberty Coal Mining Co. of Dora, Walker County, was incorporated recently with a capital stock of \$4000. J. T. Baird, Little Baird and O. L. Jones were named as incorporators.

Another Walker County company filed articles of incorporation, known as the Emergency Coal Co., of Carbon Hill, capitalized at \$2000. Papers were filed by W. S. Thornton, M. B. Thornton and J. W. Little.

Louisville, Ky.—The Walnut Coal Co., of Louisville, capital \$3000, has been incorporated by W. F. Burwinkle, Edward E. Weber, J. S. Miller and R. E. Gordon. The company will operate a wholesale coal yard in Louisville. Miller and Gordon are connected with the recently incorporated Gordon-Miller Coal and Coke Co., with mines in eastern Kentucky, and Gordon is also head of the Trace Branch Coal Co., Barboursville, Ky., operating a small wagon mine. The latter concern has increased its capital from \$1500 to \$5000. Offices of the company have been established in the Lincoln Building, Louisville.

Industrial News

Madisonville, Ky.—The Coil Coal Co. has leased about 750 acres of coal properties in the Madisonville district, and is planning to commence operations at an early date for development.

Philadelphia, Penn.—The Hunter Pressed Steel Co., the office and works of which have been located at Orthodox and Horrocks Sts., has moved into its new quarters at Lansdale, Penn.

Primrose, Penn.—The Carnegie Coal Co. is reconstructing its Primrose tipple and has contracted with the Roberts & Schaefer Co., engineers and contractors, Chicago, for another Marcus picking table screen.

New Orleans, La.—The Municipal Dock Commission is considering plans for the construction of new elevators and coal-handling apparatus for cargo coal at the city dock. E. B. Thompson is president of the commission.

Columbus, Ohio.—The Coal Ridge Coal Co., which has opened a branch in Columbus under the name of the Erie Coal Co., the selling organization, will soon open a second stripping operation in the Cambridge field. The producing mine is a stripping proposition and the production is unusually large.

Ages, Ky.—The Adair Mining Co., which recently completed its organization, is planning to commence operations at once on the development of extensive coal properties in this district, to have a capacity of about 250 tons daily. The company recently filed articles of incorporation with a capital of \$30,000. J. E. Adair of Harlan, Ky., is president and manager.

Chattanooga, Tenn.—It is reported that the majority of the local coal dealers have orders booked up which will take care of receipts until some time in September, while additional orders are steadily pouring in. Many of the dealers are just getting orders placed during the first part of May. A regular winter rush for coal has characterized spring and summer business.

Dora, Ala.—The Southern Cotton Oil Co., Birmingham, is planning for the installation of a quantity of mining equipment for the development of coal properties in this district for the furnishing of coal for the operation of its various mills. The company has acquired a site of about 920 acres and is planning to have a daily capacity of approximately 200 tons. It is estimated that the equipment will cost in the neighborhood of \$100,000.

Charleston, W. Va.—Dr. E. B. Stephenson and James S. Lakin have recently closed a deal by which they disposed of the 1500-acre tract of coal lands at Queens Shoals, known as the Queen Shoals Land Co. property. The consideration was nearly \$100,000. The land was purchased by the Fire Block Coal Co., which is controlled by Detroit and Cleveland men. J. W. Miller and A. J. Saltzer will operate the property, on which one mine already is being worked.

Louisville, Ky.—It has been reported that 3,000,000 bushels of coal are coming down the Ohio River from the Kanawha

district of West Virginia, arrangements having been made to manipulate the series of locks and dams to furnish an artificial stage to carry the coal as far as Louisville. Part of the big river shipment will be dropped off at Cincinnati, Madison and upper river points, while a portion of it will go to Jeffersonville and New Albany, Indiana.

Toledo, Ohio.—Considerable activity has developed in the lake trade, as is shown by the records of loadings at the Hocking Valley and Toledo & Ohio Central docks during the week ending July 20. During that week the Hocking Valley docks loaded 168,000 tons as compared with 160,000 for the previous week, making a total of 1,663,507 tons for the season. The Toledo & Ohio Central docks loaded 59,000 tons as compared with 45,000 tons the previous week, making a total of 80,900 tons for the season.

Indianapolis, Ind.—New retail prices for Indiana coal, resulting from increased rates, have been announced. An advance of from 15c. to 25c. a ton is noted. Indiana lump coal, formerly quoted at \$5.50 a ton by local retail dealers in Indiana, is now priced at \$5.65. Indiana egg has been raised from \$5.40 a ton to \$5.65 a ton, and Indiana mine-run coal is now advanced from \$5.15 to \$5.45 a ton. An increase of 75c. a ton is noted in the newly quoted price of Brazil block coal, but this larger increase is caused by the fact that this grade of coal comes from mines remote from the railroad, necessitating long wagon hauls for delivery.

Detroit, Mich.—Because of the increase in passenger fares on railroads under Federal control, Michigan's largest coal mine and some of the others are shut down. Some of the miners insist the operators should pay the increase in railroad fare, amounting to about 10 per cent. The No. 8 mine of the Robert Gage Coal Co., producing 1000 tons a day, is closed. The Uncle Henry mine, owned by the Consolidated Coal Co., and practically every other mine in the Saginaw district, shut down last Wednesday. W. K. Prudden, state fuel administrator, has been asked to take the matter up with the Federal Railroad Administration. Unless a settlement is speedily attained it is feared the trouble will extend to all mines of the Saginaw valley.

Cleveland, Ohio.—Ohio's production of coal in 1917 was 41,677,986 tons, an increase of 5,392,500 tons over 1916, according to statistics just compiled and announced by the Ohio Industrial Commission at Columbus. In the year the number of mines increased from 853 to 1295. Twenty-six of the thirty counties in which coal is mined increased their output last year. Four reported decreased production. Gallia, Perry, Scioto, Vinton and Washington Counties more than doubled their tonnage. The four reporting losses were Guernsey, Monroe, Summit and Wayne. In total tonnage in 1917 Belmont County led with 11,156,626 tons. Athens was second with 6,313,619, Jefferson third with 5,742,240, and Guernsey fourth with 4,024,265 tons.

Louisville, Ky.—Indications are that an agreement will shortly be reached between the Government and R. C. Tway, head of the Tway Coal Co. and the James Coal Co., whereby the case to be heard by the October term of the Federal Grand Jury may be dropped. Tway got in trouble with the Fuel Administration for overcharging and violations of regulations. Expert accountants who have just completed listing overcharges during the period from October, 1917, to March 1, 1918, found overcharges of \$13,855.23. In many of the cases it will be impossible to pay the overcharges to the persons overcharged, and it is planned to hand this fund over to the Red Cross. It is believed that in consideration of the refunding of this money and payment of a fine into Federal Court the prosecution will be dropped.

New York, N. Y.—Thomas W. Russell, Fuel Administrator for Connecticut, has issued an order permitting wholesale dealers as defined by Rule 24 of the Rules and Regulations of the United States Fuel Administration to add to the purchase price of any bituminous coal shipped by water to that state a charge or commission of 35c. per net ton when the coal comes from the ports of New Jersey or New York, and 23c. per net ton when shipped from the ports of any other state. On shipments of anthracite an additional charge of 25c. per net ton is allowed. The order provides that the charge or commission shall include any purchasing or selling agent's commission heretofore authorized, and that the combined charges or commissions of any number of wholesalers or jobbers who act in the purchase of a given shipment or shipments shall not exceed the maximum charge or commission allowed for one wholesaler.

MARKET DEPARTMENT

Weekly Review

All Production Records Broken in Bituminous Regions—Anthracite Shipments Increase—Necessity of Conserving Fuel Still Remains—Transportation Facilities Unparalleled—Labor Still a Problem—Market More Hopeful

PRODUCTION records in the bituminous fields are being smashed. Coupled with the cheering news of the victories of our boys and the allies at the Marne, the successful onslaught on the storehouse of Mother Nature by the mining forces at home furnishes cause for a new song of jubilation. Every soft-coal region is reporting greater output than ever before. For the week ended July 13 the total of bituminous coal shipped from the mines amounted to 13,243,000 net tons, which is more than a million tons above the average weekly requirements set by the Fuel Administration as necessary to meet essential demands. The average weekly production of soft coal from April 1 to date, however, is estimated at 11,568,000 net tons. Therefore, to make up the total deficit of 9,615,000 net tons which now exists it will be necessary to have approximately ten more

weeks of production equivalent to that of the week ended July 13, or an output of 12,472,000 net tons during each of the 37 weeks remaining in the coal year, which ends Mar. 31, 1919. During the week under review shipments of anthracite amounted to 42,331 cars, which shows a slight improvement over the forwardings of recent weeks.

In spite of the large tonnage of bituminous, the supply continues too light to permit of the creation of adequate reserve stocks against the time when bad weather will interfere with the expeditious movement of cars. The requirements of manufacturing plants have been vastly increased by the magnitude of the work they are doing for the Government, and the importance of obtaining shipments substantially in excess of current needs cannot be too strongly emphasized. The efforts of the Fuel Administration, operators and

miners to increase production must therefore be supplemented by the elimination of every wasteful or unnecessary use of coal.

The railroads are making increasing demands for fuel, and nothing is heard of car shortage in any direction. In fact, transportation has caught up with output in a way that is really astonishing. The labor difficulties, however, multiply rather than diminish. There are restrictions now on the movement of labor from one section to another, and already there are interesting results in the coal industry, particularly in the Pocahontas and New River districts.

Developments during the past week have given the market a hopeful aspect, and consumers are beginning to believe that perhaps after all the situation may not turn out to be near so bad as was feared.

COAL PRODUCTION

A record-breaking production of bituminous coal marked the week of July 13. The output (including lignite and coal made into coke) is estimated at 13,243,000 tons, an increase over the week of July 6 (five working days) of 2,987,000 net tons, or 29 per cent., and over the current week of last year of 1,479,000 net tons, or 12.5 per cent. The average production per working day is estimated at 2,207,000 net tons as against 2,051,000 net tons during the week of July 6, or an increase of 7.6 per cent.; and as compared with the average production per working day of 1,961,000 net tons during the week of July 13, 1917.

The output during the current week of 13,243,000 net tons is approximately 1,031,000 net tons, or 8 per cent. above the average weekly requirements of 12,211,500

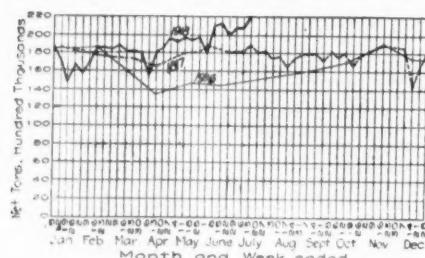
week of July 13. The increase in shipments from central Pennsylvania amounted to 34 per cent., in western Pennsylvania 30 per cent., in Ohio 27 per cent., in the district including northeastern Kentucky, high-volatile of southwest Virginia and smokeless fields of West Virginia 36 per cent., Tennessee and Kentucky 26 per cent., the district including Illinois, Indiana, and western Kentucky 30 per cent., the district including Iowa, Texas and Southwest States 26 per cent., and the district including the Rocky Mountain and Pacific Coast States 30 per cent.

Beehive Coke—Beehive coke production in the United States during the week ended July 13 is estimated at 671,000 net tons, an increase over the week preceding of 92,000 net tons, or 16 per cent., and an average production per working day of 112,000 net tons as against 97,000 net tons during the week of July 6. The principal operators in the Connellsburg, Greensburg and Latrobe districts of Pennsylvania report production during the week of July 13 at 394,000 net tons and operation of their plants at 77.2 per cent. of their present capacity. Out of the total losses of time of 22.8 per cent., 0.5 per cent. was attributed to car shortage, 18.8 per cent. to yard labor shortage, 0.5 per cent. to plant disability and 3.1 per cent. to all other causes.

Byproduct Coke—Byproduct coke plants during the week ended July 13 were operated at 89.8 per cent. of their present capacity, slightly lower than the ratio of 90.3 per cent. reported for the week ended July 6. Improved labor conditions during the week were offset by time lost in plant repairs and the cause of the slight decline for the week was not reported. Repairs to plants caused slightly increased losses in time in Illinois, Massachusetts and Ohio, while the operators in Minnesota and

net tons established by the United States Fuel Administration. However, the average weekly production for the coal year to date is estimated at 11,568,000 net tons or 5.3 per cent. behind the weekly requirements. In order to make up the deficit for the coal year from Apr. 1 to date of 6,643,000 net tons per week, or 9,615,000 net tons, it will be necessary to have approximately ten more weeks of production equivalent to that of last week, or a production of 12,472,000 net tons during each of 37 remaining weeks in the coal year ended Mar. 30, 1919, a figure only twice attained—the week ended June 15 and the current week.

Reports from the carriers show increased shipments from all districts during the



CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

Week Ended:
June 22 June 29 July 6 July 13

Bituminous shipments, 123 roads. 212,849 219,625 180,090* 234,899† Anthracite shipments, 9 roads... 41,170 41,641 31,493 42,331

* Revised from last report. † Subject to revision.

Pennsylvania failed to report the cause of the slightly increased losses, although in the latter state better labor conditions existed. Improvement in operating conditions in New York were due to repaired plants and in the district including Michigan, Missouri and Wisconsin to better supply of byproduct coal and repaired plants. Increased capacity in Pennsylvania during the week of July 13 is attributed to placing new ovens in operation by the Bethlehem Steel Co. at Steelton and by the Carnegie Steel Co. at Clairton.

BUSINESS OPINIONS

American Wool and Cotton Reporter—The Government has by no means taken all of the machinery, although more or less irregularity exists in the condition of the different sellers. There has been quite a long period where the production available for civilian distribution has been approximately 50 per cent. of the available producing capacity. Few can estimate what the future may be, but the total supply of goods for the season's requirements, while undoubtedly less suitable than usual, might be in actual yardage not greatly inferior to what the market requires.

Broadstreet's—Government needs and war work dominate, and industry, despite rather more unsement in labor lines, is still at a very swift pace. Wholesale and jobbing trade at primary centers reflects some seasonal slowing down and is quiet in comparison with the speed in industry, but in the larger markets of the west, south, northwest and Pacific coast, the reports are that trade is large and demand eager for an ordinary dull period. Retail trade, notwithstanding a good number of midsummer sales, is quieter than for some weeks past, but even at that loses nothing in comparison with the volume of business doing at this date in other years.

Dry Goods Economist—The shortage of raw material continues acute in the woolen and worsted goods industry. In this connection it is interesting to note the latest order issued by the War Trade Board under date of July 12, which declares: (1) That all outstanding licenses for the importation of wool from Uruguay, Argentina and South Africa are revoked as to ocean shipments made from abroad after July 28; (2) that hereafter no licenses for the im-

portation of wools from the countries named will be issued for the remainder of the present calendar year, except to the Quartermaster General of the U. S. Army.

Marshall Field & Co.—Current wholesale distribution of dry goods has been in excess of the heavy shipments of the corresponding week in 1917. The majority of our general line salesmen have been in the house during the past week. Road sales for immediate and future delivery from those remaining on the road have been better than they were last year. Customers have been in the market in greater numbers. Collections for the week show a satisfactory increase over those of the same week a year ago.

Atlantic Seaboard

BOSTON

Developments the past week give the market a hopeful aspect. Improvement at Hampton Roads due to emergency action which cannot be kept up. More and more difficulty over getting full quota from Pocahontas and New River districts. Production section of the Fuel Administration begins to show grasp of the situation. Apparently transportation has caught up with output in every direction. Remarkable fact that not one coal embargo has been in effect on New England roads since Apr. 1. Movement all-rail shows steady improvement. Railroad reserves also show an upward trend. Box cars being sent forward on direct order of the fuel authorities. Anthracite receipts all-rail continue in good volume. Retail advance general because of freight increase.

Bituminous—New England has always been responsive to improved market conditions, and this season is no exception. Somewhat increased receipts all-rail, better loading at the Virginia terminals, and signs here and there of accumulating stocks of 30 to 60 days are enough of themselves to make buyers less pessimistic. Of course, such improved conditions will have to be maintained over several weeks, or even months, before this territory will be in position to slacken its effort to get coal, but the moral effect is good and fly-by-night traders are doing less business on irregular propositions than has hitherto been the case. Reports that production has lately improved have also had their effect on buyers, and just now there is a period, probably a brief period, when consumers are saying that perhaps after all things may not turn out to be so bad as feared. Doubtless it is all a part of the general hopefulness that is in the air just now.

Bottoms at Hampton Roads have met with better dispatch the past week. Steamers that were thought certain to be detained several days were loaded with a fair degree of promptness. By the trade, however, it is realized that it was only through the strong arm of the Government that this was accomplished. First a special order was issued to send 200 cars daily from high-volatile districts out of shipments that would ordinarily move west, and later, when it was seen that the 10,000 tons or so a day would not be enough, a general embargo was declared against all westbound movement, thereby throwing a large extra volume to tide. Even byproduct plants in western territory were not excepted, and just that one fact will make it plain the quantity of coal now moving east will have to be replaced. It is therefore almost inevitable that delay at Hampton Roads will follow. Steamers will be available in increasing numbers, and certainly the outlook is not favorable today for anything like budget requirements for New England.

Difficulties in the smokeless region multiply rather than diminish. For a time there was a feeling that labor shortages would be made up with less trouble than in other fields, because miners would be attracted to thick-seam districts from fields where mining is more difficult. The operation of the new system of state directors of labor is affecting this, however. There are restrictions now on the movement of labor from one section to another, and already there are interesting results in the coal industry. The Pocahontas and New River districts are therefore chiefly dependent upon the usual labor supply, and under present conditions it is inadequate. The increased output of coke is another important factor, those in charge of coke production having seen to it price was made attractive. The railroads that serve these districts are also making increasing drafts for fuel, and when to all these other demands is added the enormously increased requirements of Government service, not to mention the tremendous powder plants now in process, it will be seen how slim a chance New England has of getting its

water coal in sufficient volume, the largest part of which is supplied via the Hampton Roads piers.

The remarkable thing in New England is the fact that not one coal embargo has been in force on the New England railroads since Apr. 1. Indeed, it has been freely stated by the railroads themselves that at least 200 cars more per day can be handled through the gateways than are now coming through. The receipts of bituminous are increasing, but slowly thus far. For the first 16 days of July the average daily movement through the New England gateways for New England destinations was 611 cars of commercial bituminous and 151 cars railway fuel, a total of 762 cars. It is rumored that the current week will show shipments from the central Pennsylvania district alone of 4000 cars, but there is little hope of the movement reaching the 4500 figure that was set early in June to make up deficiencies during April and May. It is evident that the statistical section at Washington set too high a mark for the Altoona district in the first place. If now the gas coal region can be relieved of the heavy railroad fuel requisitions made upon it especially for the low sulphur grades, another gain could be registered.

The New England railroads are beginning at last to show materially larger stocks than during June. Thus far most of the accumulation has been built up from water-borne shipments, but beginning the current week, from shipments already started from the mines, there should be a considerable gain in receipts all-rail. The diversion of 40 cars daily from less essential industries to help the Boston & Maine railroad is still in effect and will hardly be canceled until the reserve of that road has reached a much higher figure than at present.

Apparently the Fuel Administration in some of the Pennsylvania districts at least is looking upon box car shipments, particularly from wagon-loading mines, as free coal, and it is quite likely most of the box cars forwarded will be handled in this way. It is common knowledge that many abuses in price, etc., have crept into box-car transactions, and doubtless this present program is an effort to straighten out certain of the shippers. Certainly New England consumers will take all the box cars that are sent, although there is a little anxiety here and there as to quality. None the less orders are being filed through the district representatives and for the present a considerable movement is looked for.

The inspection force attached to the office of the Altoona district representative is doing some effective work. When a car is rejected by an eastern railroad or by inspectors working under the Tidewater Coal Exchange the case is reported back and thorough investigation follows. In some instances cars have been ordered withheld from certain mines until the operators carry out directions that their coal be properly prepared before being sent forward.

Anthracite—All-rail receipts of domestic sizes for the first 16 days of July show an average of 514 cars. On July 14 the movement rose to 837 cars, a gratifying figure. Steam sizes maintain what has been a fairly steady movement, this month thus far showing 175 cars as a daily average, although the percentage has dropped from 30 per cent. to 25 per cent. By water there is no material change. The movement of barges is still slow on account of the lack of power. More coal could be loaded if bottoms could be moved more promptly. To a surprising extent owners of barges from New York are disinclined to send them east of Providence, and today there is a marked shortage of bottoms for New Bedford and for Boston, even through the canal.

The Boston retail price was advanced on July 18 from \$10.25 to \$11 for broken, egg, stove and chestnut. This is an advance of 75c. a net ton, and covers shovel delivery. Where coal has to be carried 40c. extra is charged, as against the former charge of 25c. for basketing. Another trade paper recently stated this advance much more than covered the increase in railroad tolls that made the advance necessary. This statement, however, takes no account of the fact that most of the Boston retailers receive coal by water and that on coal by barge from Philadelphia the increased charge is something like 83c.

NEW YORK

Receipts must increase rapidly to prevent serious shortage here. Efforts for wage increase interest producers. Dumps at local docks show slight increase. Shipments on city order of 300,000 tons to begin Aug. 1. Bituminous situation quiet. No free coals to be had and consumers storing little. Unnecessary illumination prohibited. Miners dissatisfied.

Anthracite—A rapid improvement in receipts of anthracite must be made if this city is to escape a near-coal famine next winter, according to some of the trade, while others look for a comparatively easy situation, expecting that the Anthracite Committee of the Fuel Administration will soon cancel their order diverting additional tonnages into New England. They expect that some similar order may be issued regarding shipments to this city, and it will be necessary, many claim, to keep homes warm. Of the five boroughs comprising Greater New York it is admitted that Manhattan is in better shape than any of the others. This is due to the small increase in additional building construction, while the larger increase in population in the other boroughs is resulting in increased need for fuel.

Producers and shippers here are watching with interest the efforts of the mine workers to reopen the wage agreement of last November, although it was stipulated that it was to remain in force until 1920. A committee of mine workers has been appointed to confer with the operators for that purpose, the miners setting forth that living conditions have changed since the signing of the agreement.

No successor to Mr. Wiggin as State Fuel Administrator has yet been announced, although promises are reported to have come from Washington that the appointment was to have been made "within a few days." The report that New York State is to be divided into two districts continues to persist.

The Lehigh Valley Coal Sales Co. has advanced its mine prices for buckwheat and barley 20 and 30c. respectively, placing them on a level with other companies shipping to the lower ports, namely \$5.15 and \$4.15 f. o. b. docks.

Dumpings at the local tidewater docks for the seven days ended July 19 show 7375 cars of anthracite dumped, an increase of 50 cars as compared with the previous seven days.

With the exception of barley, there is a scarcity of all sizes. Some shippers offer barley only and invite buyers to include that size in their orders for the other coals. Other shippers have nothing to offer, their entire output being provided for.

Markets Commissioner Day has announced that he expects shipments on the 300,000-ton contract made with the DeJulio Coal Co., of 220 Broadway, to commence Aug. 1, at the rate of 1500 tons daily. This coal will be taken from two culm banks near Ashland, Penn., and is said to consist of a fine grade of stove, chestnut and pea sizes, mixed. The coal is to be delivered alongside piers in Manhattan at \$6.55 per ton, and it is expected that local dealers will see that it is delivered from these points.

Current quotations, per gross tons, f.o.b., tidewater, at the lower ports, are as follows:

	Circular	Individual	Circular	Individual
Broken..	\$6.75	\$7.50	Pea....	\$5.20
Egg....	6.35	7.10	Buck....	5.10
Stove...	6.60	7.35	Rice....	4.65
Chestnut	6.70	7.45	Barley..	4.15
			Boiler..	4.30

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—The local situation shows no improvement. Coal is scarce, regular customers receiving just about sufficient to keep their plants going with hardly any surplus. Free coals are seldom heard of, although there is an urgent call. The order of the local Fuel Administration prohibiting unnecessary illumination of show cases and windows between sunrise and sunset is not expected to result in much saving of fuel here, but is believed to be the forerunner of other and more drastic orders soon to be issued.

The decision of the Interstate Commerce Commission regarding the placing of demurrage charges on boats after they have been registered at the loading ports and not loaded because of frozen coal due to weather conditions is being awaited by the trade. This is an important matter to coal shippers, and if decided in their favor will result in considerable saving to them.

There were dumped at the local tidewater docks in the period July 13-19 inclusive, 7130 cars of bituminous, an increase of 41 cars over the preceding seven days. Car supply shows some improvement and operators are kept busy at some of the mines to get them loaded.

The New England situation continues to be responsible for heavy shipments from this market. There is a good movement of bunker fuels and the surplus is not large.

Current quotations, based on Government prices at the mines, net ton, f.o.b. tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. Gross
Central Pennsylvania:		
Mine-run, prepared or slack.....	\$3.30	\$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-mine.....	3.08	5.23
Prepared.....	3.36	5.51
Slack.....	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite little changed. Slight improvement in spots. Promise of better deliveries soon encourages dealers. New conservation rules. List of restricted uses growing. School coal being arranged for. Miners show signs of uneasiness. Steam coals extremely active. Bituminous improvement continues. Car supply good. Wagon mines must prepare coal.

Anthracite—It is believed that some real progress has been made this week, at least in one section of the city that was most troublesome last winter and would undoubtedly need more attention this year. In the southwestern section of the city, owing to the proximity to the immense Hog Island shipbuilding plant, the increase in population has been extremely heavy. Coal can be consigned to yards from which deliveries can be made into this territory over five different branches of railroads.

New rules and regulations regarding the conservation of fuel are being made almost daily and it is certain that dealers are having trouble trying to obey the laws governing their business. The latest ruling compels them to attach a 2c. fuel stamp when filling orders for No. 1 buckwheat coal for schools, churches, hospitals, hotels, office buildings, stores, apartment houses, theaters, banks, garages, greenhouses, restaurants or saloons. It will be remembered that formerly the dealer was exempt from this tax on all No. 1 buckwheat deliveries, except those for purely domestic use, and this new expense to the dealer is not as trivial as it first appears. All this has been occasioned by the fact that with the placing of buckwheat in the exempted class as a domestic fuel it makes it necessary for these orders to pass through the fuel committee's auditing office for checking, with the consequent adding of the 2c. per ton tax.

Certain dealers have been notified by the Board of Education that they have been awarded the contract for hauling coal to the schools. In many instances these are the same dealers who made the deliveries in 1916, as it is the understanding the fuel administration is arranging for the same shippers to furnish the coal this year. Pending the arrangement of final details as to the source of supply, no definite announcement has as yet been given out. It is believed that the delay is principally due to the apportioning of the 30 per cent. buckwheat which the schools have agreed to take.

It now develops that no official authority for dumping coal on the pavements and not carrying it in the bins of the customer has ever been granted to the retail men. While the practice has been adopted to a limited extent, Mr. Lewis is now considering allowing the dealers to make an increased charge for this work, and if the customer objects to this he then has the option of doing it himself.

There continue to be some complaints of certain shippers who are not strictly abiding by the allotment as fixed by the distribution committee, and this in spite of the very pointed letter sent out recently. The dealers in certain sections point out instances of retailers not in business in 1916, who are receiving particularly heavy shipments. It is believed, however, that the entire matter will be remedied and that such instances have been due to a misunderstanding as to the exact meaning of the regulations.

It is becoming pretty generally known among the trade that the production of family sizes is not up to the record of last year, and it is this that has made them so uneasy of late. The best informed men in the trade cannot but admit that the city is bound to witness some strenuous times next winter unless some method is found whereby production can be immediately increased. In the matter of draft exemption it now appears that the army authorities claim that the local boards have had power all along to exempt mining men, but this does not satisfy those who see the serious aspect of the diminishing labor supply at the mines. It is still asserted that a general order should be issued prohibiting any

man who has been engaged in work at the mines from enlisting in any branch of the service. Even in the cases where boards have exempted men they seem to have felt a stigma attached to it and have gone off and enlisted in other branches.

There also seems to be a growing restlessness among the miners in the region. Last week the question of increased wages cropped up for the first time in a semi-official way, and now this week there was a local strike at a colliery, where several hundred men went out claiming that they should be paid better wages for certain classes of work. It is the private opinion of many well-informed coal men that a definite demand for increased wages will be made before the first of the year, as the men claim to be strongly affected by the recent heavy increase in the cost of commodities of all kinds.

Steam coals continue in the extreme demand that has prevailed for weeks past, with the exception of culm locally. From outlying points the demand for this grade is actually becoming heavier each day, particularly from the New England region. The general price continues to be \$1.25.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide	Line	Tide	
Broken.....	\$4.90	\$6.25	Buckwheat.....	\$3.40	\$4.45
Egg.....	4.50	5.85	Rice.....	2.90	3.80
Stove.....	4.75	6.10	Boiler.....	2.70	3.70
Nut.....	4.85	6.20	Barley.....	2.40	3.30
Pea.....	3.45	4.70	Culm.....	1.25	2.15

Bituminous—The good car supply in evidence since the early part of the month continues and most mines report as many cars on hand as they are able to load. Good shipments are also coming into the city, and fair progress is being made in storing coal, although it is felt that there could probably be a more equitable distribution, as there are some important plants that do not seem to be faring as they should.

The preferential shipments to New England are still in effect and all shippers are making efforts to maintain their quota, although the feeling continues that they should be allowed more leeway in the distribution. The rumored order denying cars to the wagon mines does not seem to have been given the official stamp as yet. It is a fact, though, that several mines of this kind have been shut down for turning out an inferior product and will not be allowed to resume shipping until they are in position to prepare the coal.

The brokers still continue to be able to get quite a little tonnage, the most of which is obtained, especially by the smaller houses, by keeping men permanently in the region to negotiate for the coal right at the mine.

In tide coal, due to some new arrangements for deliveries from the pools, there is a prompter movement of fuel and quite a heavy volume of business is moving, both in bunker and tide shipments.

At this time there is a movement on foot among the soft coal men to effect a more stable arrangement with the fuel authorities when coal is seized and delivered to new consignees by their direction. Of course, this is being done only in the rarest cases now, but was quite common last winter. The shippers are asking that the authorities see that they are given advance notice in every instance of this kind, so that they can keep their records from becoming confused and at the same time make the necessary credit arrangement.

Lake Markets

PITTSBURGH

Distributing problem somewhat simplified. Consumers hope to receive stocks later. Market transactions reduced.

The matter of distributing Pittsburgh district coal has been somewhat simplified by the requirement that only current wants of consumers may be supplied, in the interest of forcing lake shipments to the maximum to make up for the required diversion to the Navy of West Virginia and Kentucky coal. No estimates are yet made as to the quantity of lake coal that will be shipped from the district this month, but hopes are entertained that the quota originally assigned for the month, 1,300,000 tons, will be greatly exceeded.

A slight improvement in labor performance is noted, due to the individual efforts of the coal operators as well as to the efforts of the Shipping Board, but there remains much to be desired in this direction.

Coal consumers are not getting all the coal they would like to receive by any means, but those engaged in the more essential lines of war work are well supplied through the efforts of the distributing agency. As to stocks to tide over the winter, consumers feel that if after the middle of October they receive extra coal at the rate at which it is to be shipped in the lake trade from now until then, minus the additional amount that will be required for domestic purposes, they may enter the period of bad weather in fairly safe position. River coal shipments are rather heavy and it is only river coal that local dealers can put into stock.

Scarcely any coal is being sold in the open market, except for such transactions as are dictated by the coal distributor. Brokers are doing less business than formerly, as it is only when their customers have a preferred claim for coal that the business is sanctioned. The market remains quotable at the set limits: Slack, \$2.10; mine-run, \$2.35; screened, \$2.60, per net ton at line, Pittsburgh district, brokers being allowed to charge customers up to 15c. commission in addition.

TORONTO

Coal situation increasingly serious. Dealers months behind in deliveries and refuse new orders. Fair supplies of soft coal on hand. Fuel controller issues reassuring statement. Attitude of United States appreciated.

The coal situation continues to grow more serious. While deliveries of anthracite in Toronto have been so far fully equal in volume to those of last year the dealers are months behind in filling orders, and generally refuse to make sales even for future delivery. Very few new orders are being taken and great apprehension is entertained that conditions next winter will be considerably worse than those experienced last season. There is a fair supply of bituminous on hand and many consumers unable to obtain hard coal are purchasing soft coal for domestic use. R. C. Harris, Fuel Controller for Ontario, while admitting that the supply is uncertain, does not consider that a serious coal famine is probable. He says: "The Fuel Administration of Canada is alive to the situation in a greater degree than any one else in the Dominion and is straining every effort to cope with the situation." H. A. Harrington, secretary of the coal section of the Retail Merchants' Association, has just returned from the United States, where he has arranged for a further supply of coal. He expresses strong appreciation of the generous treatment Canada is receiving from the United States, but emphasized the fact that strict fuel conservation is an absolute necessity.

Quotations (largely nominal under the circumstances) for best grades per short ton are as follows: Retail anthracite, egg, stove, nut and grate, \$11; pea, \$10; bituminous steam, \$9; slack, \$8; domestic lump, \$10.50; cannel, \$13. Wholesale f.o.b. cars at destination, three-quarter lump, unprepared, \$6.41; prepared, \$6.61; slack, \$5.48.

BUFFALO

Coal not as plenty as it was, especially anthracite. Fuel authorities are watching the situation closely. Extreme caution is the plan. All demand is heavy.

Bituminous—The demand for all sorts of coal is heavy, but the real situation cannot be made out from that. Consumers are taking all the coal they can get, if they can take care of it. It is believed that considerably more bituminous is in the hands of consumers than there was a year ago, but that is not the case with anthracite.

The situation is such that the operators are afraid of priority orders that will keep them from filling their contracts and cause distress in one place where it is relieved in another. This feeling is heightened by the orders coming out every few days, cutting off the supply to this or that industry or institution that is not considered essential. The breweries and the greenhouses are to have but a half supply, and the country clubs must burn wood or peat.

The prices of bituminous remain at \$4.65 for thin-vein Allegheny Valley, all sizes, \$4.45 for Pittsburgh lump, \$4.20 for Pittsburgh mine-run and slack, \$6.15 for cannel and \$5.85 for smithing, all per net ton, f.o.b. Buffalo, with jobber's profit added.

Anthracite—The situation grows more complicated. The county fuel administration is demanding monthly reports from all distributors of the amount of coal delivered, to whom and the amount asked by the consumer. At the middle of the month a circular was sent out to trestle owners or others who supply retailers, giving the names of 84 concerns who had not complied

with the regulations. The claim is mostly that no monthly report had been made. In some cases the consumer was given the full amount asked for, instead of the two-thirds allowed. These dealers will get no more coal till they square themselves with the fuel authorities.

The retailers of anthracite generally complain that their orders increase while the supply falls off, but the authorities say that when the allotment that has been asked for is granted (900,000 tons for the county) a better supply will be obtained. Just now the lack of a state fuel administrator is holding the local trade up, as everything has to be referred to Washington direct.

In the lake trade the supply is also running down. It was found that the Canadian districts had been getting more than their share by rail, and now the lake shipments to Canadian ports are made very small. There is a general falling off, the amount for the week being only 80,500 tons, of which 37,800 tons cleared for Duluth or Superior, 25,200 tons for Milwaukee, 8000 tons for Sheboygan, 7800 tons for Chicago and 1700 tons for Depere.

With coal so scarce many vessels are obliged to go out light and coal freight rates are easy at \$1 for Depere, 60@65c. for Chicago, 55c. for Milwaukee, 50c. for Sheboygan and 48c. for Duluth.

CLEVELAND

Movement of bituminous is all that can be expected with virtually a 100 per cent. car supply at the mines, but this is not sufficient to meet present needs, especially of the Northwest. With half of July gone and the month's lake quota unfilled so far by nearly 500,000 tons, operators are agreed that Fuel Administration officials must provide adequate labor supply and insist that no coal be stored at present.

Bituminous—Operators with mines in the Pittsburgh vein district of southern Ohio report every condition highly satisfactory except labor. Car supply continues at approximately 100 per cent. With what labor is on hand, operations are being rushed at a point not equalled so far this coal year. But a 100 per cent. car supply today does not mean a 100 per cent. output when compared with two years ago, operators claim. Instead, with men going into the army and more steady employment in the cities, a 100 per cent. car supply now means only, on an average, 75 to 80 per cent. of maximum output two years ago. One operator, who with a 100 per cent. car supply used to get out 60,000 tons of bituminous a month from one mine, now is getting only 34,000 to 36,000 tons under comparative circumstances. Less stocking of coal at industrial plants is apparent; some seems to be done despite orders to the contrary. The latest report of the Pittsburgh Vein Operators' Association for Ohio, for the week ended July 19, gives shipments to railroads as 1678 cars; to the Great Lakes, 2894; to Ohio, 1463; to Michigan and Indiana, 251, and Canada, 101. These shipments were made as follows: On the Baltimore & Ohio, 2914 cars; Pennsylvania, 1501; Wheeling & Lake Erie, 1706, and on the New York Central, 138.

Lake Trade—At a meeting of the coal committee of the Coal and Ore Exchange, which is handling the pool of Great Lakes vessel, coal and iron ore interests this season, it was decided to send Federal Fuel Administrator Garfield a letter urging him to help speed shipments of bituminous up the Great Lakes. The committee is of the opinion that if stocking of coal is absolutely prohibited until the lake season is over, and some of the industries that have large storage piles are compelled to dig into them now instead of diverting coal that should be going up the lakes, that the Northwest's requirements of 28,000,000 tons will be met, and a 100 per cent. supply next winter will afford coal for all when the need for it arises. Though fuel administration officials at Washington are reported to be banking on July proving a 5,000,000-ton month—it is scheduled as a 4,900,000-ton one—the first half of July saw only 1,791,320 tons shipped, according to the Coal and Ore Exchange's figures. This is about 500,000 tons behind. Lake carriers now are getting more cargoes than in the early part of the month, but many are going up light. Shipments in the week ended July 13 are known, by corrected figures, to have been 821,640 tons. For the week ended July 20 the first figures compiled give the movement as 19,611 cars.

DETROIT

Shipments of steam and domestic coal continue too light to permit creating adequate reserves. Anthracite supply is short. Lake shipments improve.

Bituminous—Although requirements of many of Detroit's manufacturing plants are increased by the magnitude of the work which they are doing for the Government, the supply of steam coal made available in the local market continues less than the amount regarded as adequate to supply needs in previous years. While there is enough coal arriving to provide for present use, jobbers say the supply is too small to permit a satisfactory building up of reserves, which should now be under way, and therefore is insufficient. The importance of obtaining shipments substantially in excess of current needs is emphasized as necessary to assure continued operation of plants turning out military supplies and other Government work, in case developments later in the season diminish receipts. The present supply affords little diversity in selection as most of the shipments consist of mine-run. Some slack is included, but jobbers complain that domestic stock is deficient in amount. The situation and outlook occasion much anxiety. Unless receipts are largely increased at an early date, it is feared hardship and suffering will be unavoidable for household consumers unsupplied with fuel.

Anthracite—Detroit's supply of anthracite is not increasing. With the season half gone, distribution has been held back by lack of coal and there is still no movement of sufficient size to enable the retailers to get delivery under way.

Lake Trade—There is a freer movement of bituminous coal to lake loading docks and shipments by boat during the week attained a larger volume than usual. The total, however, failed to attain the amount necessary to carry out the schedule for the month. The vessel capacity available for loading was greater than the supply of cargoes. Many boats went up light.

COLUMBUS

The coal trade in Ohio continues active in every respect. There is a strong demand for steam, lake and domestic tonnage. Production shows a light gain.

Strength is the chief feature of the coal trade in Ohio. All departments of the industry have been active and buying is on a brisk scale. Steam users, as well as retailers, are in the market for a large tonnage, while lake shippers are straining every point to move a large tonnage to the Northwest. On the whole the tone is satisfactory and special efforts are being made to speed production.

Domestic trade is one of the strongest points at this time. Dealers are in the market for a larger tonnage to replace depleted stocks caused by heavy retail buying. Most of the orders are for immediate delivery. Householders are buying actively, as they believe a fuel shortage will occur during the coming winter. Retail prices are firm at the levels which have prevailed for several weeks, but when freight matters are adjusted still higher prices will be announced. Pocahontas is a scarce article in the Columbus market. Some West Virginia splints are being received, but the main fuel supply comes from the Hocking Valley and Crooksville districts.

A large amount of screenings is reaching the market because of the heavy lake business in lump. This is relieving the steam situation to a certain extent, but on the whole the steam demand is firm. Consumers, especially those using a large tonnage, are adopting every means possible to increase their storage. The smaller steam users are following the example of the larger consumers and are also trying to secure a surplus. Railroad consumption continues large. The threshing rush is now about over, and a large tonnage was required for that purpose. Freight rate advances are expected to have a considerable influence on the steam trade.

Production is fairly good in most of the mining districts of the state. Labor shortage is reported from every field, but most especially from eastern Ohio and Massillon. The Hocking Valley produced about 85 per cent. of normal during the past week, and the same percentage is reported from Pomeroy Bend. Crooksville and Cambridge had about 75 per cent., while eastern Ohio is lagging behind with about 65 per cent. The last named field is hampered both by car shortage and labor shortage.

The lake trade is active, and the Fuel Administration is stimulating the movement as much as possible. All fields are short of pre-season estimates, and shippers are urged to move coal as rapidly as they can. Loadings at the docks continue to show up well, despite some hindrances.

LOUISVILLE

Demand for all grades of coal continues strong, with dealers considerably behind on deliveries and no surplus stocks accumu-

lating. Somewhat better supply of coal moving in.

There has been an appreciable improvement in the movement of coal from the east and west Kentucky mining districts due to improved labor conditions and a fair car supply. The combined effects of the work or fight order, and the fact that agricultural labor is not in such big demand during the present growing season, has resulted in the mines being much better supplied than for some time past. However, in some sections, especially western Kentucky, drafts have played havoc with labor. The St. Bernard Mining Co., operating eleven mines in the Earlington, Ky., district, has been forced to close one mine, and the balance are averaging 60 per cent. of their capacity. Over 100 men were sent from the district to the army camps on July 19.

Effects of the light production are shown in the July stocks in the four retail yards of the St. Bernard Coal Co., at Louisville, two yards having no lump coal, and the other two having four cars between them. About 15 cars of steam coal, 10 of nut and slack and four of Straight Creek gives the company a stock of slightly more than 30 cars at a season when the yards should be jammed to overflowing with surplus stock.

Coke

CONNELLSVILLE

Small gains in production. Byproduct oven building proceeds slowly. Blast furnace output unsatisfactory. Reclassification of screened coke.

The coke situation is without important incident. Production in the region seems to be increasing, but the average gain from week to week is almost infinitesimal. The byproduct ovens are probably doing as well as could be expected, averaging an output of about 90 per cent. of rated capacity, a percentage which apparently cannot be materially exceeded. Construction of the new byproduct ovens is proceeding very slowly. At the Clairton plant of the Carnegie Steel Co., for instance, where a start was made by drawing some coke from the first battery of 128 ovens on June 25, it was hoped that the other four batteries might be completed by about the end of August; but the latest estimate is that it may be Dec. 1 before the whole 640 ovens are in operation, and completion of the second five batteries is set correspondingly farther in the future. A slight evidence of easier conditions as to coke supply is the decision of the company to blow in this week its Zanesville furnace, a small detached stack operated only when iron is scarce and coke in fairly good supply. It uses Pocahontas coke.

Generally speaking, the blast furnaces do not appear to be particularly short of coke, and yet their pig-iron output is far from what it should be considering the number of stacks in blast and the output per furnace that was attained in 1916.

W. L. Byers, district representative of the Fuel Administration, interprets the regulations of the Fuel Administration announced July 8 to mean that coke that is improperly screened may be sold at \$4.50 if it is fairly satisfactory, otherwise it must be classed purely as "breeze" and therefore sold at not above \$3, a price it would hardly bring in the market, perhaps. The new regulations make the \$7.30 price for crushed coke apply to coke over 1-in. instead of over 1-in. Clean screenings under 1-in. are limited to \$5, or \$1 under furnace coke. Breeze is set at a \$3 limit, or one-half the price of furnace coke, and includes unassorted coke and material left after removal of prepared sizes.

The market remains narrow, practically no furnace coke being openly offered, although some is picked up by furnace representatives in the region from time to time. There is a fair volume of foundry coke available, and sometimes operators are willing to pay brokers a small commission for disposing of it. The market is quotable at the set limits: Furnace, \$6; foundry, 72-hour selected, \$7; crushed, over 1-in., \$7.30; prepared sizes of clean dry screened coke under 1-in., \$5; breeze, \$3, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended July 13 at 353,470 tons, an increase of 3575 tons.

Buffalo—The demand for coke is good, and with more than 50,000 tons of iron ore coming in by lake every week the furnaces must be running as never before. Still the coke is seldom turned over to jobbers to sell in these days, the Government prices being paid to the ovens direct. These are \$7 for foundry and \$6 for furnace at the

ovens, with freight \$2 from the ovens and no selling profit to add. Vessel owners are pleased with the ore trade, as there is less delay at the unloading docks than common, so that they can make quick trips. The supply promises to last the season through.

Middle Western

GENERAL REVIEW

Feeling of optimism among Middle West coal operators. Labor situation arouses apprehension. Car supply unusually good.

There is at present a decided spirit of optimism among the coal operators of the Middle Western district. This is all the more noticeable, because for the past three months the outlook, seen through the eyes of the average operator, has been anything but bright. This condition has been brought about by a number of facts, chief among which is the labor situation. The establishment of a Federal Employment Bureau to help the labor situation is being watched with keenest anticipation, and it is expected that very substantial assistance is to be rendered to the coal industry through this channel. This is the consensus of opinion of a number of the big operators.

Another bright spot is the probability of prohibition for the duration of the war. The operators have been in favor of this step for a long time, as it is a well known fact that alcohol has a very decided effect on coal production. The officers of the miners' unions are also for prohibition, both on the grounds of patriotism, as more coal is needed, and on the grounds of looking after the best interests of their own members. The percentage of accidents caused by drunkenness is appalling.

The car question for the past week has been unusual. Railroads like the C. B. & Q., the C. & N. W., the I. C. and others report nearly 100 per cent. supply of cars at their respective mines. Transportation difficulties at this time cut no material figure. Consumers report a rapid movement of coal from the mines to their factories.

CHICAGO

Market conditions undergo change. Easing of steam sizes. Rumor that Government is to place large order.

Market conditions have changed considerably during the past few days. There has been a slight weakening in the domestic market, as dealers are no longer satisfied with mere coal. They have a sufficient supply, either rolling to them or in their bins, to be more discriminating. Of course the demand for high grade and carefully prepared coals from southern Illinois, Indiana and the Springfield districts remains just as strong as ever, but the dealer is not tempted with 2-in. lump or mine-run as he was a week ago.

There has been a noticeable easing of all steam sizes, especially on screenings. Operators are offering freely a large tonnage from nearly all the producing districts. Some coal is selling below the Government price, but most of the better grade products are firm at "Government prices current at time of shipment."

There is a pretty well defined rumor out to the effect that the Government is about to place some large orders. The total will, in all probability, amount to 300,000 or 400,000 tons to be used at various camps and military depots in this territory. If this rumor materializes, a decided change in market conditions may be looked for at once, as the order will call for mine-run, and the tonnage is big enough to remove enough coal from both the steam and domestic market to strengthen any weakness that might develop.

Quotations in the Chicago market are as follows, per net ton, f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La- Salle, Bureau and Will.
Steam lump.....	\$2.55@2.70	\$2.55@2.70	\$2.95@3.10	\$2.55@2.70	\$2.55@2.70	\$3.25@3.40
Domestic lump.....	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Egg or furnace.....	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Small egg or nut.....	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Stove.....	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Chestnut.....	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Pea.....	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Washed egg.....	2.75@2.90	.....	2.75@2.90	2.75@2.90	2.75@2.90	3.45@3.60
Washed stove.....	2.75@2.90	.....	2.75@2.90	2.75@2.90	2.75@2.90	3.45@3.60
Washed nut.....	2.75@2.90	.....	2.75@2.90	2.75@2.90	2.75@2.90	3.45@3.60
Mine-run.....	2.35@2.50	2.35@2.50	2.75@2.90	2.35@2.50	2.35@2.50	3.00@3.15
Screenings.....	2.05@2.20	2.05@2.20	2.35@2.50	2.05@2.20	2.05@2.20	2.75@2.90
Washed slack.....	2.05@2.20	2.05@2.20	2.05@2.20	2.05@2.20	2.05@2.20	2.75@2.90

MILWAUKEE

Report that breweries were to be denied coal of any nature after Jan. 1 causes commotion. New anthracite rates still held back. Cargoes arriving steadily.

With huge steamers filled to their decks with coal moving up the rivers daily, and with mountainous heaps of the fuel in constant sight from the several viaducts which span the river valleys, it is surprising that there is so much agitation and concern in Milwaukee over the prospective supply for next winter. This is due largely to the persistent campaign of alarm pursued by the state fuel bureau and councils of defense, in their efforts to stimulate the placing of orders by small consumers, and also to the fact that brewers and maltsters have been restricted in the use of bituminous coal and denied anthracite altogether. Anything affecting the breweries in Milwaukee is bound to receive the attention of the masses. Milwaukee is not so far behind in her coal supply that the shortage cannot be made up before the close of navigation if reasonable energy is employed at the sources of supply.

Anthracite continues to be delivered without knowledge as to cost. Those who claim to know say this is done to allow dealers on the outskirts of the city (who are selling anthracite received by rail at rates considerably above what the city schedule will be) to work off their stocks before the lower prices are announced. As these dealers helped the fuel situation by getting this coal, the fuel administration is not disposed to expose them to loss.

An ordinance which would permit coal dealers to dump coal in the streets in front of points of delivery and thus shirk the problem of putting it into bins was voted down by the common council of the city. There is no question but the policy of the fuel administration in forbidding full deliveries to be made at this time will greatly complicate the delivery problem during the winter, as two deliveries will now have to be made in a great many cases where formerly one sufficed.

Notwithstanding the coal stringency, there will be a great sufficiency of coke and gas for heating and cooking purposes. Both gas and coke producers are urged strongly by the Government to increase their facilities for making coke because of the need of coal byproducts in the making of high explosive shells. The Milwaukee Coke and Gas Co. and the Milwaukee Gas Light Co. are running to their highest point of production.

Cargo receipts since last week's report total 3000 tons of hard and 14,350 tons of soft coal, making 175,591 tons of hard and 1,108,707 tons of soft since the opening of navigation.

ST. LOUIS

A rather quiet market in a general way, with steam sizes heavy. Domestic demand shows some slight improvement. Equipment shortage rather acute. Labor problem serious in all districts. Carterville continues scarce. No outside shipments.

The local situation has been rather quiet on account of the car shortage, which has kept the market somewhat uniform—that is, a supply that about equaled the demand in domestic sizes, but with the steam sizes off. There still continues to be a fairly good demand for Carterville coal, and the supply coming in seems to diminish.

The labor shortage in this field is perhaps the most severe of any, for the demand for this grade of coal is greater than in any other two fields in southern Illinois. The operators are doing their very best to increase the tonnage, and as a rule the men are co-operating. The railroads continue to draw heavily from this field, and it is understood that they are going to insist that they get this coal in preference to others who have always used this in the past. Much similar conditions exist in the Duquoin field.

The Mt. Olive field continues the only stable district in the southern Illinois field. The labor supply is rather good, the car

supply is fair, and the supply about equals the demand. The railroads continue to draw heavily on this section, but the domestic demand is being taken care of promptly.

The Standard district presents an entirely different phase. There is still at times to some extent an overproduction, but with the decreasing labor supply and car supply this is soon going to be a thing of the past. For the past few months there has been more coal produced than could be absorbed by the market to which this field was entitled to ship. Car supply has been unusually poor throughout the Standard field the past week and the movement of cars has dragged a little. Steam sizes continue to be heavy, especially screenings.

There is considerable railroad coal moving from this territory at the present time, nearly all mine-run, and this is going at a price of from \$2 to \$2.20, with here and there a report that some is being sold as high as the maximum price, but this is something unusual and cannot be verified. There is no outside coal coming in from the eastern fields and very little from Arkansas.

The new price on coke effective July 9 has caused the local market to be \$10.10 f.o.b. ovens for gashouse and byproduct, and there is a shortage of both. The country demand for coal is good at the present time. Especially is this so in the South.

On the 16th and 17th Lieutenant Governor Wallace Crossley, Fuel Administrator for Missouri, had a conference with other administrators in Chicago relative to the allotment of different Illinois coals for Missouri and other states. It developed in the hearing that St. Louis got a total of 6146 cars of Illinois coal in the month of June for all purposes, and that the State of Missouri for the same month got 8908 cars. St. Louis got from the Williamson and Franklin County field for all purposes a total of 1785 cars, which is a respectable showing in comparison with the movement of some coals in the same periods in past years, and shows that St. Louis as a whole is storing coal and to a greater extent than is generally supposed. The prevailing market is, per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Franklin County	Staunton	Standard
6-in. lump.....	\$2.55@2.70	\$2.55@2.70	\$2.40@2.70	
3x6-in. egg.....	2.55@2.70	2.55@2.70	2.35@2.55	
2x3-in. nut.....	2.55@2.70	2.55@2.70	2.35@2.55	
No. 2 nut.....	2.55@2.70	2.55@2.70	2.55@2.70	
No. 3 nut.....	2.55@2.70	2.55@2.70	2.55@2.70	
No. 4 nut.....	2.55@2.70	2.55@2.70	2.55@2.70	
No. 5 nut.....	2.05@2.20	2.05@2.20	2.05@2.20	
2-in. sergs.....	2.05@2.20	2.05@2.20	1.25@1.50	
3-in. lump.....	.....	.....	2.25@2.40	
2-in. lump.....	.....	.....	2.25@2.40	
Steam egg.....	2.35@2.50	2.35@2.50	1.85@2.00	
Mine run.....	2.35@2.50	2.35@2.50	2.35@2.50	
Washed:				
No. 1.....	2.75@2.90	2.75@2.90	2.75@2.90	
No. 2.....	2.75@2.90	2.75@2.90	2.75@2.90	
No. 3.....	2.55@2.75	2.55@2.75	2.55@2.75	
No. 4.....	2.55@2.75	2.55@2.75	2.55@2.75	
No. 5.....	2.05@2.20	2.05@2.20	2.05@2.20	

Williamson and Franklin County rate is \$1.10; Duquoin field, \$1; Standard and Mt. Olive fields, 95¢.

General Statistics

BALTIMORE & OHIO

The following is a statement of the coal and coke tonnage moved over the Baltimore and Ohio system and affiliated lines during the month of April, 1918, as compared with the corresponding month of the previous year:

	Tons, 1918	Tons, 1917
Coal.....	3,600,539	2,861,603
Coke.....	319,236	309,823
Total.....	3,919,775	3,171,426

DUE to the fact that "Coal Age" has changed its day of issue from Saturday to Thursday, and also to the slowness of the mails, we have been compelled to omit from this issue the market reports from Baltimore, Cincinnati and Birmingham.